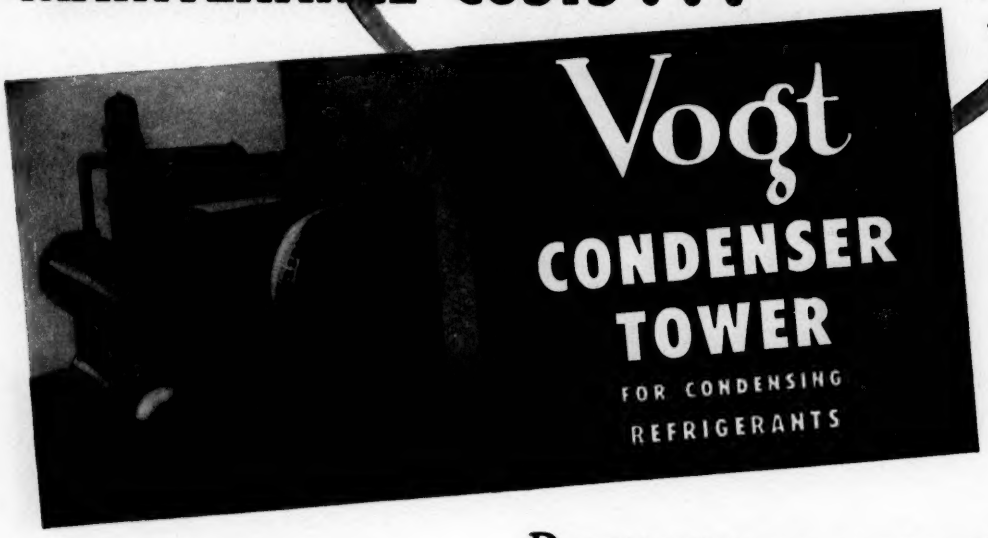
NDUSTRIAL
EFRIGERATION

New

SAVES WATER and CUTS MAINTENANCE COSTS . . .

Illustration shows two views of a 55 ton Condenser Tower prior to partial disassembly for shipment.



SINGLE RESPONSIBILITY:

Vogt, leading builder of refrigeration condensers, assumes responsibility for engineering the unit. Only one purchase order needed.

SHOP FITTED:

To cut down field assembly labor. Requires no cutting or fitting of pipe.

Designed for today's water conservation requirements, and to keep refrigeration costs low, the *new* Vogt Condenser Tower meets the need for a proven, readily cleanable condensing unit.

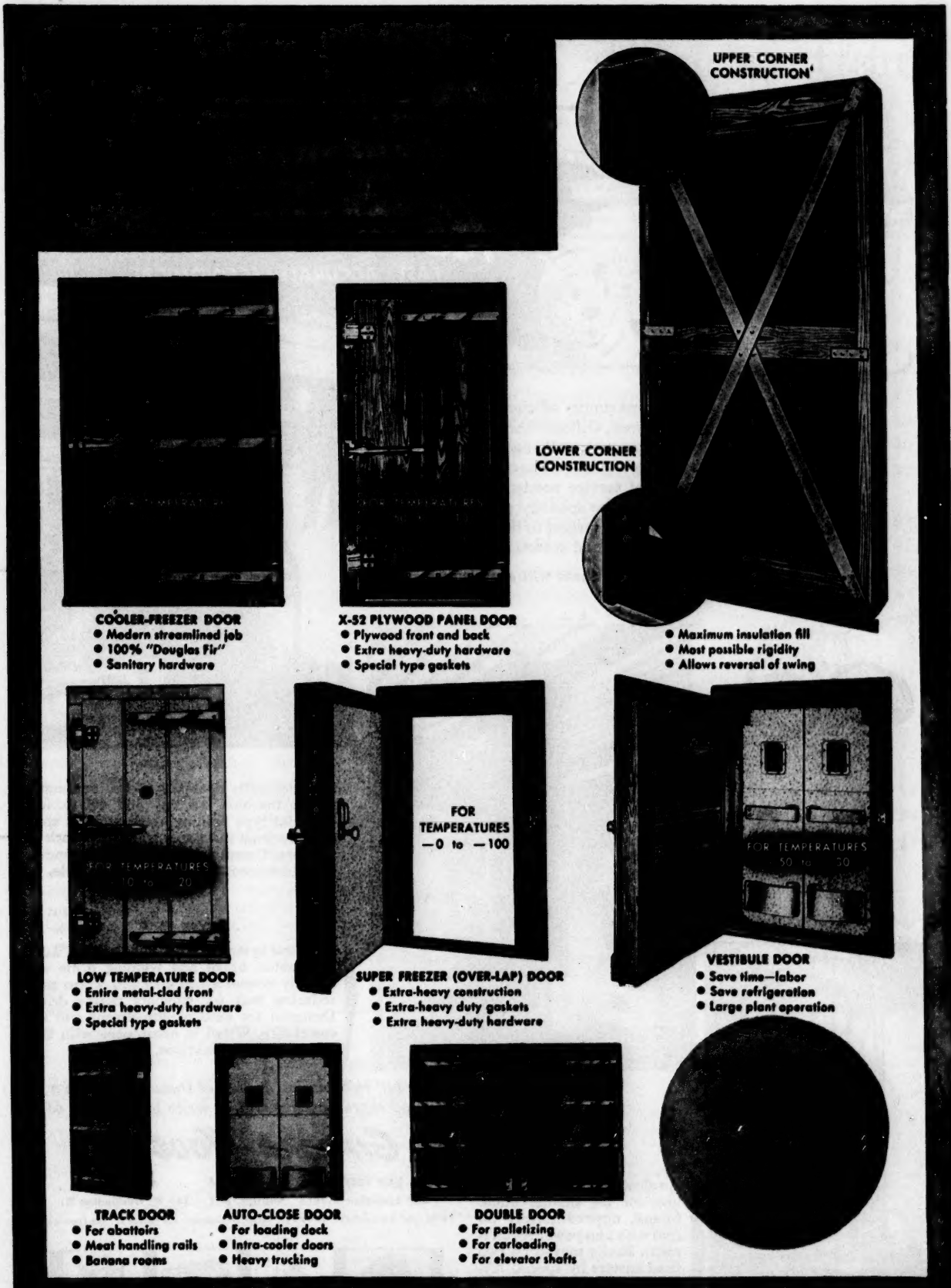
The Vogt Condenser Tower consists of a multipass straight tube condenser, a receiver, an oil trap, a cooling tower, and a water pump. Removable cast iron heads permit easy cleaning of the condenser tubes.

Water costs are extremely low since the cooling water is recirculated continuously and requires only a small amount of makeup to replace losses due to windage and evaporation.

Condenser Tower units are available in capacities ranging from 5 to 50 tons refrigeration. Additional information will be furnished upon request.

HENRY VOGT MACHINE CO., Louisville 10, Kentucky

BRANCH OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO, ST. LOUIS, DALLAS, CHARLESTON, W. VA.



BUTCHER BOY REFRIGERATOR DOOR CO. • HARVARD, ILL.

For maximum efficiency in ice-tiering operations, Gifford-Wood manufactures three compact, well engineered, portable ice-tiering units. They provide the full range of service needed to handle 300- and 400-lb. ice speedily and safely, in all plants from the largest to the smallest. Built to Gifford-Wood standards of durability.

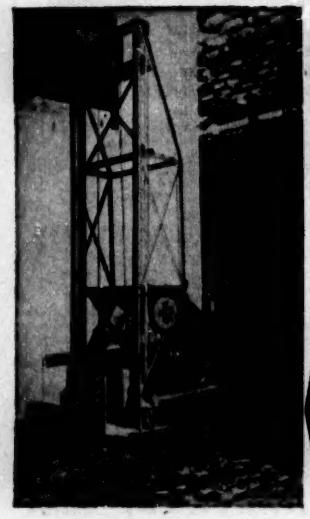
One of these will exactly suit your requirements . . .

TYPE "LA"

An electrically operated (3 hp) automatic tiering machine for 300- and 400-lb. ice. Solenoid type holding brake and cut spur gears to drum shaft, speed 113 fpm, stack to 10 tiers. Complete with visual tier-finder, push-button control, plug and receptacle.

TYPE "N"

Identical in structural design to Type "LA", but motor, brake and winding drum are directly connected to enclosed worm gear reducing unit for compact power drive. Designed for ease of adjustment and accessability. Wired in accordance with Underwriters' specifications.



TYPE "QR"

An electrically driven tiering unit for the smaller plant. Speed, approximately 50 fpm with 1 hp power requirement. Easily moved on two fixed casters by special lift-about attachment. Excellent durability with great portability.

For full information on any of these units have a Gifford-Wood representative call, or write for Bulletin 451.

GIFFORD-WOOD CO.

NEW YORK 17 420 Lexington Avenue — *Since 1814* — **HUDSON, N. Y.** — **CHICAGO 6** 565 W. Washington St.

Pacific Coast Representative: Western Ice Equipment Company, 420 Market St., San Francisco 11

1954 Conference on Cryogenic Engineering

THE 1954 Conference on Cryogenic Engineering will be held September 8, 9, and 10 under sponsorship of the National Bureau of Standards at the NBS-AEC Cryogenic Engineering Laboratory in Boulder, Colorado. The first meeting of its kind in this important new field, the Conferences will treat engineering problems in the temperature range below 150 K (−123 C). Plans call for the presentation of technical papers which will deal chiefly with problems encountered in the production, storage, transportation, and use of low-temperature liquefied gases—hydrogen, nitrogen, and oxygen. Information regarding registration and reservations may be obtained from M. M. Reynolds of the NBS Boulder Laboratories, who is chairman of the Conference.

In addition to the technical sessions, the Conference on Cryogenic Engineering will take part in the official dedication of the National Bureau of Standards Boulder Laboratories on September 11, 1954. A symposium on Propagation, Standards, and Problems of the Ionosphere has also been arranged by the Bureau's radio propagation laboratories in connection with the dedication.

Low-temperature liquefied gases are finding increased application in industry and national defense, making necessary larger, more convenient, and less hazardous equipment for producing and handling them. As a result, many new and highly complex engineering problems have arisen in the low-temperature field, where much remains to be learned about the mechanical and thermal behavior of engineering materials and the nature of the processes.

Room Air Conditioners Show Huge Increase

ROOM air-conditioner shipments by manufacturers during the first four months of 1954 were about 84.8% over the same four months of 1953, it was announced by Geo. S. Jones, Jr., managing director of the Air-Conditioning and Refrigeration Institute (ARI).

This increase is indicated by a study just completed by ARI which shows that about 795,850 room air-conditioning units were shipped by manufacturers during the first four months of 1954 compared with 430,670 units during the same period of 1953.

Industrial Refrigeration

formerly **ICE AND REFRIGERATION**

Now in its 63rd Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 127 **August, 1954** **Number 2**

Contents

Refrigeration Uses in Industry 15
Growing Necessity for Qualified Operating Engineers 19
Vending Prepared Ice Returns Good Profit 23
32,233,966 Tons of Ice Sold in 1953 28
Producing Dry Ice 30
New Chicago Bus Station Completes First Year 32
New Aluminum Alloys Provide Tensile Strength For U. S. Strato Jet Bombers 42
Low Temperatures Used by Industry 45
Ninth International Congress to Meet in Paris 50
National Association Practical Refrigerating Engineers 33
Defrosting Low Temperature Evaporators 33
News Notes and Chapter Activities 34
NAPRE Question Box 37
Topics Announced for Educational Sessions 40

Departments

What's New in Equipment ... 4
Press Briefs 9
Coming Conventions 49
Deaths 52
Manufacturers News 54
Catalogs and Bulletins 55

The Cover:

Using refrigeration in industry. Quick-freezing of foam rubber latex before it's heated in a mold like this helps assure more uniform cell structure of the finished product. (Photo courtesy of DuPont Company) See story on page 15.

Published Monthly by NICKERSON & COLLINS CO.

General Offices: 433 N. Waller Ave., Chicago 44, Ill. Telephones: AUstin 7-1303-04-05

H. T. McDERMOTT, EDITOR AND PUBLISHER — E. R. CURRY, MANAGING EDITOR — J. R. KELAHAN, TECHNICAL EDITOR — H. D. BUSBY, ASSOCIATE EDITOR

ADVERTISING—O. RHODIUS ELOFSON, DIRECTOR — EDW. DAVIESON, Advertising Representative

L. R. TOWNSLEY, GENERAL MANAGER — HELEN G. SMITH, ASSISTANT MANAGER — E. P. SWANSON, SUBSCRIPTION — V. S. SMITH, PRODUCTION

CHANGE OF ADDRESS—Notify publisher and your local post office promptly of change of mailing address to avoid non-receipt of copies. Copies incorrectly addressed, because of failure to notify publisher, cannot be replaced. Upon request, post office will provide, without cost, convenient "change of address" mailing cards.

INDUSTRIAL REFRIGERATION, Vol. 127, No. 2 Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U. S., $2.00 per year; other countries, $3.00. Single copies, 25 cents.

Copyrighted 1954 by Nickerson & Collins Co. Acceptance under Section 34.64 P. L. & R. authorized.

The entire contents of this journal are covered by general copyright, and special permission must be obtained from the publishers of same before reprinting long extracts or reproducing illustrations; but editors desiring to do so are welcome to use not more than one-third of an article, providing credit is given.

Industrial Refrigeration is indexed regularly by Engineering Index, Inc., and is microfilmed for library use by University Microfilms.

What's New

MACHINERY
APPLIANCES • PROCESSES

Air Filter Gauge Signals Need for Replacement

A UNIQUE "one-piece" low-cost filter gauge for cooling and ventilating units has been introduced by Bacharach Industrial Instrument Company, Philadelphia, Pa. This gauge determines the filter's resistance to free passage of filtered air as well as its capacity to clean the air, and automatically indicates when the filter has become dirty and should be replaced.

Bulletin on Filter Gauge

Outstanding feature of the gauge is its simplicity in design, installation and operation. It can be mounted merely by drilling four ¼" holes through the wall of the blower chamber, then pressing a pronged hook on the instrument's back through two of the holes. The gauge does not require a connection across the filter, and it uses no electric current. It is activated directly by the negative pressure present in the blower chamber, which is slight when the filter is clean, but increases as the filter becomes dirty.

Vogt "Package" Steam Generator

VOGT'S Class VV Package Unit steam generators are described in a new bulletin PSG-1 issued by Henry Vogt Machine Co., Louisville, Ky.

The generator which is factory assembled is ready for operation at installation site after making piping, electrical and stack connections. Units are available in capacities from 10,000 to 30,000 pounds of steam per hour in three standard pressures of 175, 250 and 375 psig. Firing and control equipment of many different types can be used with Class VV steam generators.

New Wire or Tube Clamp

A NEW line of clamps, "J" Clips, are being offered nationally by Barton Staple Co., East Hampton, Conn., after extensive local testing. The "J" Clip is a single shank steel clamp or staple that holds a wide variety of tube or wire snugly and securely in any installation where the clip can be driven into wood.

The New "J" Clip

The beaded shank, projecting level with the top, permits a direct hammer blow for driving power and accuracy. Since there is only one point entering the wood, there is no spreading effect as the clip is driven home as might occur with a U shaped staple. Its wedge fit develops a clinging power that holds more securely, yet the tapered shank permits simple removal with a claw hammer. Patent has been applied for.

Four sizes are available: one for ¼ in through 5/16 in outside diameters; another for ⅜ in through ½ in, and a separate size each for ⅝ in and 1 in. Where BX cable is to be clamped, "J" Clips are supplied with gripping grooves on the inner surface to prevent cable slippage. A choice of 5 plated finishes is offered: zinc, or galvanized, nickel, cadmium, copper and lustron.

Maintaining Door Seal

HOW to maintain a tight seal between a cold storage door and frame is outlined by the Jamison Cold Storage Door Company of Hagerstown, Md., in a new 16-page, pocket size booklet. Illustrations and drawings supplement written instructions. Emphasis is on proper use of Jamison's wedgetight fasteners and adjustoflex hinges in maintaining proper tight seal. Two-color booklet tells how to correctly position frames, how to correct erection errors, and how to adjust hardware.

Heavy-Duty Thermostat Developed by Honeywell

A NEW heavy-duty thermostat has been developed by Minneapolis-Honeywell Regulator Company for accurate control of temperatures in areas where dust, corrosion and humidity are a problem. The rugged, multi-purpose instrument, the company said, is engineered specifically for such uses as in fruit warehouses, banana-curing warehouses, in sweet potato curing sheds, sea-shore buildings, and in a wide variety of farm applications. It will control gas, oil or stoker-fired heating plants.

New heavy-duty precision limit switch developed by Minneapolis-Honeywell.

The new thermostat features corrosion-resistant parts and completely sealed Micro switch contacts. The liquid-filled temperature sensing element is coiled within the cover for protection from damage, ease of cleaning and maximum sensitivity. Control range is between 35 and 100 F. A switching action is provided so it can also be used to regulate building ventilating systems.

Desired temperatures are set by a handy external knob with settings indicated on an easily-read dial on the front of the bright red cover. The instrument measures four inches high by six inches wide. It may be mounted on a flat surface or, by using special mounting straps, can be installed on a beam or post.

New Appliance Items

(Continued on page 6)

THERMOBANK FOR Ammonia

by KRAMER

THERMOBANK

the defrosting system that makes Ammonia SHINE!

LUCERNE MILK COMPANY, of Los Angeles, Calif., modernized with KRAMER AMMONIA THERMOBANK automatic defrosting system to end years of expensive manual defrosting.

"BEFORE" photo shows iced condition of the old overhead coils.

"AFTER" photo, same room, modernized with KRAMER Ammonia THERMOBANK at minus 25° F; 6400 gallons hardened daily.

INSTALLED BY ASSOCIATED REFRIGERATING ENGINEERS, LOS ANGELES, CALIFORNIA.

WRITE NOW FOR BULLETIN TA-182

KRAMER TRENTON CO.
Trenton 5, N.J.

Take a page from my book when next you order accessories and supplies!

OIL

York Oils are stable, the most economical in performance per dollar of oil cost.

REFRIGERANTS

York carries a complete line of "Freon"* refrigerants in all sizes of containers.

*Reg. Dupont Tradesark

FILTERS

York supplies cleanable and throw-away filters in every standard size.

RENEWAL PARTS

York Renewal Parts meet the same rigid standards as original York equipment, are stocked at York warehouses country-wide.

VALVES AND FITTINGS

York offers the industry's most complete line of "Freon" and Ammonia Valves ... from ¼" to 14".

● York accessories and supplies are available from York district and branch warehouses.

IT ALWAYS PAYS TO USE YORK ACCESSORIES AND SUPPLIES

Air Filters • Air Fittings • Automatic Controls • Brine Testing Sets • Can Covers • Can Dumps • Can Fillers • Charging Connections • Coils and Piping • Cold Storage Doors • Freon Refrigerants • Gas Masks • Ice Cans • Maintenance Contracts • Meters • Pumps • Oil • Oil Traps • Purge Devices • Receivers • Renewal Parts • Suction Traps • Spot Service • Valves and Fittings.

accessories and supplies by york

York Corporation York, Pennsylvania

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

Halide Leak Detector

DEVELOPED by Turner Brass Works', engineeers, Sycamore, Ill., this new leak detector unit was designed to provide easier handling, greater sensitivity and the convenience of a light weight disposable fuel tank. Claimed by the inventors to detect leaks of all non-combustible Halide refrigerants, it reacts to gas by changes in color and intensity of flame. It has long burning time, and only a small flame is required. The unit is light weight, 3¼ lbs. There is no refilling problem. When disposable container is empty the entire fuel tank is replaced. Available at all air conditioning, refrigeration and electrical jobbers.

Halide Leak Detector Unit

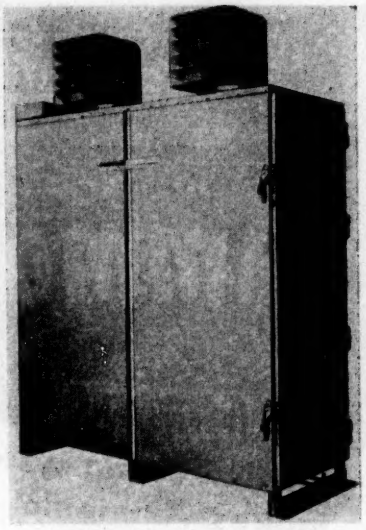
Heavy Duty Cargo Cooler

PRODUCTION of a new high capacity heavy-duty cargo cooler to meet the refrigeration needs of large semi-vans on cross country hauls has been announced by the Rue R. Elston Company, manufacturer of cargo heaters and coolers for the trucking industry with headquarters in St. Paul, Minn.

Constructed of steel and aluminum, the unit (trade-named the M-600) has a capacity of twelve blocks of dry ice weighing approximately 600 pounds. The outer steel housing, as well as all unpainted metal parts, is lined with rubber latex to eliminate outside frost and rusting.

Incorporated into the unit are two six or 12 volt motor driven fans operating off the vehicle's battery or a 110 volt AC standby unit. One blower is in continual operation providing constant air circulation at all times, the manufacturer states. The other fan, operated by an automatic thermostat, draws chilled air from completely around the aluminum ice chamber, maintaining a desired temperature. A gas valve is located underneath the unit to allow discharge of CO_2 gas to the outside.

Standing 68 inches, 56 inches long and 20 inches wide, the unit's aluminum ice chambers have 6800 square inches of cool-



Elston Cooler Model 600

FREEZER TRUCKS

DESIGNED FOR EACH APPLICATION TO SUIT YOUR NEEDS

ACCURATE CAN FILLERS

•

ICE CAN GRIDS

•

CORE FILLERS

•

CORE SUCKERS

•

FROZEN FOOD LOCKERS

•

FREEZING PANS & TRAYS FOR DUCKS, CHICKENS, FISH, etc.

•

BRINE TESTING KITS

PHONE 7-5519

ICE CANS

WELDED OR RIVETED HIGH OR LOW PRESSURE ARCTIC-POWNALL CANS "ULINE" BOTTOM CANS.

CABLE ADDRESS: KNICKSTACO

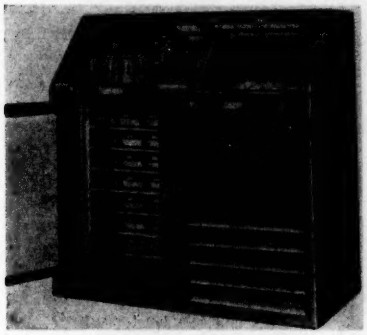
KNICKERBOCKER STAMPING COMPANY

PARKERSBURG, W. VA.

ing surface from which the cold air is drawn. Other cooling units manufactured by the St. Paul concern include the Model 450 cooler for regular cooling duties in semi-vans and the Model 300 for trucks 18 feet or under.

New Ice Cube Maker

A SELF-CONTAINED ice cube maker has been introduced *by* Nor-Lake, Inc., manufacturers of refrigeration equipment.



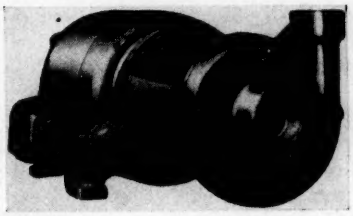
Nor-Lake Ice Cube Maker

Recommended for use in restaurants, hospitals, hotels, clubs and taverns, the unit is insulated throughout with Fiberglas and has a storage capacity for two bushels of cubes as well as the bushel being formed in its 21 freezing trays. Another feature is an ice cube tray filler, which permits filling of trays with one hand and eliminates water spilling.

Dimensions of the self-contained model are: height, 39½ inches; width, 41 inches; depth, 26 inches; shipping weight, 400 lbs. In addition to the self-contained type, Nor-Lake also manufactures a 16-tray remote ice cube maker with 1½ bushels storage capacity, weighing 200 lbs.

New Carver Electropump

A NEW compact, close-coupled Model BB centrifugal pump, offered by Carver Pump Co., Muscatine, Iowa, has proved itself a versatile workhorse for air conditioning cooling towers, in food and beverage plants, industrial plants and in other general service applications. It is the most recent addition to Carver's line of Electropumps.



Model BB Electropump

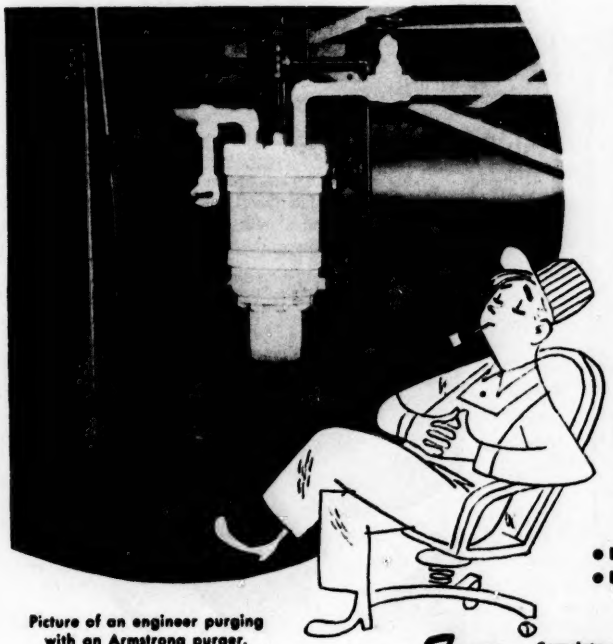
Simple in design and construction, it is efficient in operation. Model BB Electropump is a combination of motor and pump for lasting, dependable service. Being close coupled it is ideal where space is at a premium.

These Carver pumps of 1½ inch discharge, in 2, 3 and 5 hp sizes, have capacities up to 150 gpm and heads up to 140 feet. They supplement the Carver Model B Pumps which range in horsepower capacity from ¼ through 1½.

Vermiculite Filled Concrete Blocks

FIRST laboratory tests of vermiculite-filled concrete blocks often used in locker and cooler plant construction show that such blocks have twice the insulating value of blocks whose cores are unfilled. These tests by the University of Utah were reported by the Zonolite Company, Chicago, miners and processors of vermiculite.

The Utah tests showed a U value (overall coefficient of heat transfer) of 0.18 for vermiculite-filled blocks, while unfilled blocks had U value of 0.36. The sample tested was a red-lava aggregate masonry unit wall 8 inches thick, built of 8 x 8 x 16 inch blocks, and surface painted with Cementico. According to Zonolite, the tests provide authoritative confirmation of vermiculite-filled blocks' insulating value as reported for several years by architects and contractors.



Picture of an engineer purging with an Armstrong purger.

Purging is a Snap!

with an Armstrong Purger

Troublesome purging is really easy when an Armstrong purger does the job. No more need this smelly task absorb expensive man hours. When the system needs purging, just turn the purger on. It needs no further attention, but automatically removes air and non-condensable gases from the system. Turn it off when the job is done. The engineer can do other work in the time he formerly spent on purging. An Armstrong purger saves a lot of labor.

Other results of using Armstrong Purgers:

- Lower head pressure
- Less refrigerant used
- Lower power consumption
- Higher capacity
- Less cooling water consumption

Free... Complete details on purging with Armstrong purgers. Bulletin No. 221 tells how they operate, how they have helped others; gives specifications and prices. Send for a copy today.

ARMSTRONG MACHINE WORKS

860 Maple Street, Three Rivers, Michigan

TEMPLETS
give your ice a POLISH
but don't take our word for it

Convince yourself at our expense

Naturally, we know how good TEMPLETS are because of the reorders we get annually from thousands of raw water ice plants that have been using them continuously for many years. But what we know and what these other ice manufacturers know won't help sell you on the value of TEMPLETS unless you yourself are convinced that they are really good and do all of the things we claim for them in making clearer and stronger ice for you faster.

That's why we want you to try TEMPLETS in your own production, and are agreeable to sending you TEMPLET samples for a test in your own plant FREE. All you have to do to get these samples is to send the coupon below to us, and your samples will quickly be on their way to you.

TEMPLETS are made in a green tablet form which leaves no taste, no odor, no color. They are easy to use and when added to water help produce ice that is clearer and stronger and ever so much faster.

All we ask is that you give TEMPLETS a try. Our future sales to you will rest entirely on the satisfactory results you get from our samples.

Send us the coupon today—now, while you think of it!

BARADA & PAGE, INC.

KANSAS CITY, MISSOURI

B-P

Barada and Page, Inc.
Guinotte and Michigan Aves.
Kansas City 20, Missouri

Please send me a free sample and literature on TEMPLETS.

Name.....

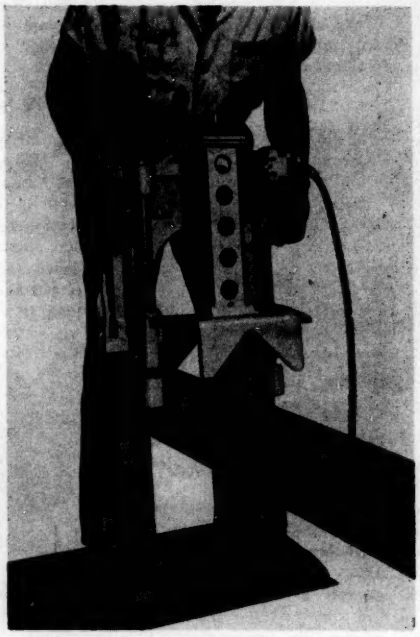
Company.....

Address.....

City.....State.....

New Portable Power Saw

A PORTABLE power pipe saw for on-the-job cutting 2 to 8 inch cast iron and steel pipe as well as bar stock and beams, has been introduced by E. H. Wachs Company, Chicago, Ill. Weighing 120 pounds and operating in a space 25 inches wide the new Wachs Guillotine Saw makes tough cuts in tight places.



The new Wachs Portable Pipe Saw

A chain pipe vise clamps the saw to the pipe, ready to cut, in a matter of seconds. Machined cast steel V saddle base assures a square cut at right angle to pipe. Pipe acts as machine tool base. Cutting time depends on pipe characteristics from four to eight minutes.

Anti-Slip Sole Pattern

IN chemical plants and refineries, processing plants, paper mills and laundries anywhere that floors are wet or slippery, workmen may enjoy the safety of a new surefooted sole tread now available on a variety of boots and shoes. It is the same tread

A convenient work shoe with neoprene Tri-Vac sole and heel

the Navy has adopted for working on the wet, oily flight decks of aircraft carriers. A patented design of multiple concentric circles molded in neoprene rubber, the tread grips with a squeegee action and provides excellent traction on wet, icy, or oily surfaces.

The crude neoprene rubber required on Tri-Vac soles is made by the DuPont Company.

PRESS BRIEFS

Grape Growers Build New Cooling Plant

THE construction of a new 3,000-square foot refrigeration plant of the Arvin Grape Growers Association on Wharton Avenue, Lamont, Calif., has been completed according to Aslan Turoonjian, superintendent. Started in April, this plant, which is the first of its kind in that area, is a followup of the association's policy of being pathfinders in everything instituted in grape production, according to Turoonjian.

The building will hold an approximate maximum of 4,000 grape crates. Containing three rooms, each 12 x 39 feet, each section is completely insulated. Inside the three cooling rooms, hot air is forced out by fans, while cold air from the ice bunkers is being pushed in, thus creating a vacuum which draws the heat from the grapes.

During a normal day of cutting and packing, a temperature of 90 degrees is sometimes found in the fruit when it is brought in from the field.

The three bunkers, one at the end of each room, will be kept filled with ice. Six tons will be required to cool 1,000 crates of grapes.

From the cooling plant, trucks will carry the fruit directly to markets and railroad shipping centers. Cooling immediately after packing will eliminate the process of having the fruit held over for several hours at distant cooling plants. This method will also eliminate the drying out of the fruit which existed under former conditions.

Construction of the plant was by Associated Refrigerating Engineers of Los Angeles, who have built several such plants throughout the state. General manager of the company is Barney Devers of Los Angeles. Head of construction is O. E. Solley, also of that city. James A. Dyas of Bakersfield was job superintendent for the project.

Australian Hill Frozen for Dam

UP where it's really cold, in the Australian Alps, scientists are planning the biggest refrigerator in the world to help build one of the 14 dams of the gigantic Snowy mountains hydro-electric scheme. There will be seven major dams and at least seven smaller dams, more than 80 miles of large diameter tunnels and 17 power stations.

Thousands of years ago a glacier left a 120 foot high hill of boulders, sand, clay, and glacial debris, which would be ideal for one of the dams if it were solid enough to prevent seepage. To seal the hill by cement injections and chemical processes would cost too much so the hill will be pierced by lines of refrigeration pipes. A wall of ice will seal the hill. Because the area is under snow for more than half the year scientists say only small amounts of power will be needed to keep the wall frozen.

Power Show in Philadelphia

THE 21st National Exposition of Power and Mechanical Engineering will be held in the Commercial Museum in Philadelphia, December 2 to 7 under the auspices of the American Society of Mechanical Engineers. Indications are that exhibit reservations will equal in number the exhibits of the last show held in New York in 1952.

When it's a question of new refrigeration coils, it's no time to speculate on dependability or to compromise on quality. And where it's a question of assuring efficient, uninterrupted operation and low maintenance throughout the years —

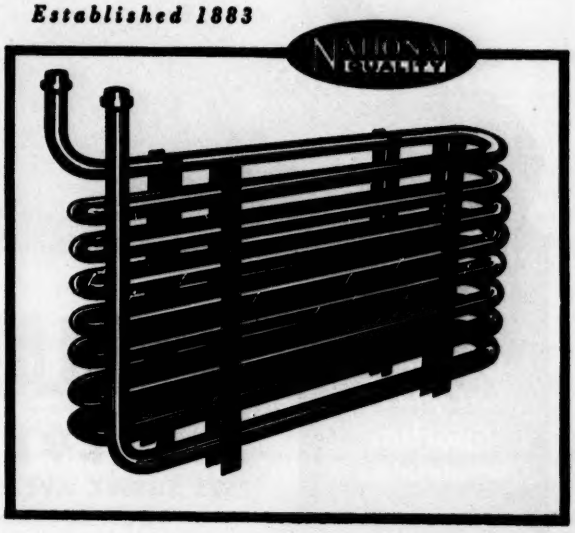
NATIONAL
REFRIGERATION COILS

offer you the benefits of over 70 years' specialization in the pipe-bending field: experienced engineering and exact production, with smooth bends, perfect welds, and accurate measurements.

Whenever you need coils, write for our free tracing-chart which shows standard dimensions ready to fill in. It will simplify your specifications—whether for zig-zag or nested box or conical or round-flat or reducing coils.

NATIONAL PIPE BENDING COMPANY
162 RIVER STREET • NEW HAVEN, CONN.

Established 1883



for PEAK PERFORMANCE on All Refrigeration Systems

DIRECT EXPANSION AND FLOODED

buy SPORLAN right down the line!

CATCH-ALL
Filter-Driers

SOLENOID VALVES

THERMOSTATIC EXPANSION VALVES

LEVEL-MASTER
Liquid Level Control

REFRIGERANT DISTRIBUTORS

Get Them *at your* Sporlan Wholesalers

SPORLAN VALVE COMPANY

7525 SUSSEX AVE. ST. LOUIS 17, MISSOURI

EXPORT DEPARTMENT 89 BROAD ST., NEW YORK 4, N. Y.

Southland Ice Opens New Meat Plant

FORMAL opening of a new $200,000 meat processing plant at Dallas, Tex. Circle T Meats featuring a quick-frozen prepackaged line, has been announced by John Thompson, assistant to the president of Southland Corp. Circle T Meats joins 7-Eleven Stores and Southland Ice Co. in Southland Corps. food family. It is believed to be the first meat processing plant in Texas and the Southwest providing a full line of quick-frozen prepackaged meats under U.S. Government inspection.

Circle T Meats, and outgrowth of 7-Eleven's meat operations, is located in a newly enlarged and refurnished plant, which has previously housed 7-Eleven's meat activities. The processing area has been increased 10-fold and the freezing capacity, divided into three temperature areas for quick-freezing, tempering and storage, is six times greater.

The Circle T line is making its debut by introducing a new family of quick-frozen, pre-packaged meats into the Texas market, included are six-ounce dinner steaks, thin sliced luncheon steaks, butter beef steaks, ground beef patties and hamburger patties.

Flash Explosion in Ice Plant

AN explosion at the Gallipolis, Ohio Ice Company plant caused more excitement than damage, and no one was hurt, although four doors were splintered by the force of the blast. Within two and a half hours repairs were completed and refrigeration resumed.

Gilbert B. Bush, and Harry Coughenour had just left the compressor room of the locker department when the "Whoosh" type explosion slammed shut the front door, shattered it, and blew its fragments out into the street. They had been working on a safety valve when the safety valve bonnet blew out, discharging ammonia and oil vapors in the pipes.

In the compressor room near the double doors leading into the corridor is a water heater with an open gas flame. It was thought that this flame ignited the gas, making the flash explosion which shot a huge flame throughout the corridor.

Fruit Growers Express Building 150 Reefers

FRUIT Growers Express Co. will add 150 mechanically refrigerated cars to its present fleet, bringing the total to 455 such cars now operated by the company. Another 100 reefers are scheduled for production later this year. The first of 150 cars came off the assembly line at the Alexandria, Va., shops in May and are being constructed at the rate of three a day. The reefers designed for zero temperature transportation are used for transporting frozen foods. The cars are equipped with diesel-electric driven Frigidaire equipment.

Food Storage Plans New Plant

A SITE has been purchased at N.E. 71st St. and 37th Avenue, Miami, Fla., by Zero Food Storage Inc. of Chicago, on which it plans to erect and operate a cold storage and freezing plant. It will have blast freezers and processing rooms for the packing and freezing of foods and holding rooms for storage and distribution. It will have approximately 85,000 square feet of floor space. Zero operates similar plants in Rochester, N.Y., New York City, Chicago and Paducah, Ky.

Ice Needed For Shrimp Boats

MECHANICAL refrigeration permits shrimp boats to remain at sea up to 25 days according to Captain Joseph Diggs of the shrimper "Sand Bar" but ice is necessary to keep the catch soft and pink and to prevent "solid mass" freezing and possibility of discoloring.

With the use of automatic refrigeration on board, such a vessel is permitted to stay out for catches up to 20,000 pounds, which would not be possible with the use of ice, as a supply of the latter, without automatic refrigeration, would not last more than two weeks.

On shrimp boats, such as the Sand Bar there are usually six medium holds and one large one, with space for about 20,000 pounds of shrimp. The boxes are partly filled with ice to preserve the shrimp before the catch comes in, the boxes being kept just below freezing by the refrigeration system in order to preserve the ice.

Addition for Hop Warehouse

WORK has begun on a $45,000 cold storage addition for the Washington State Hop Producers Association on Mead avenue, Yakima, Wash. The new addition will be 200 feet by 100 feet, will be of concrete block construction and will provide 20,000 square feet of storage space, enough to house 12,500 bales of hops, according to Charles J. Massoth, association manager.

Cooling units used to cool the present cold storage room will also supply the new section. The expansion will enable the association to store 20,000 bales of hops at the Mead avenue operation, Massoth said. The new unit is expected to be completed by September 1.

Curling Club Adds Refrigeration

MEMBERS of the Portage Curling club, Portage, Wis., took a long step toward their goal of more and better curling when they voted to increase the present refrigeration plant at the club, in a meeting held at the Elks' club. A plan which calls for an auxiliary unit costing between $5,500 and $6,000 was found to be the most advantageous and the group voted to recommend it to the board of directors at the next meeting. The present output of approximately 14 tons of refrigeration is expected to be boosted to about 25 tons. It is then expected that curling will start late in November and continue into April.

Atlantic Will Enlarge Knoxville Warehouse

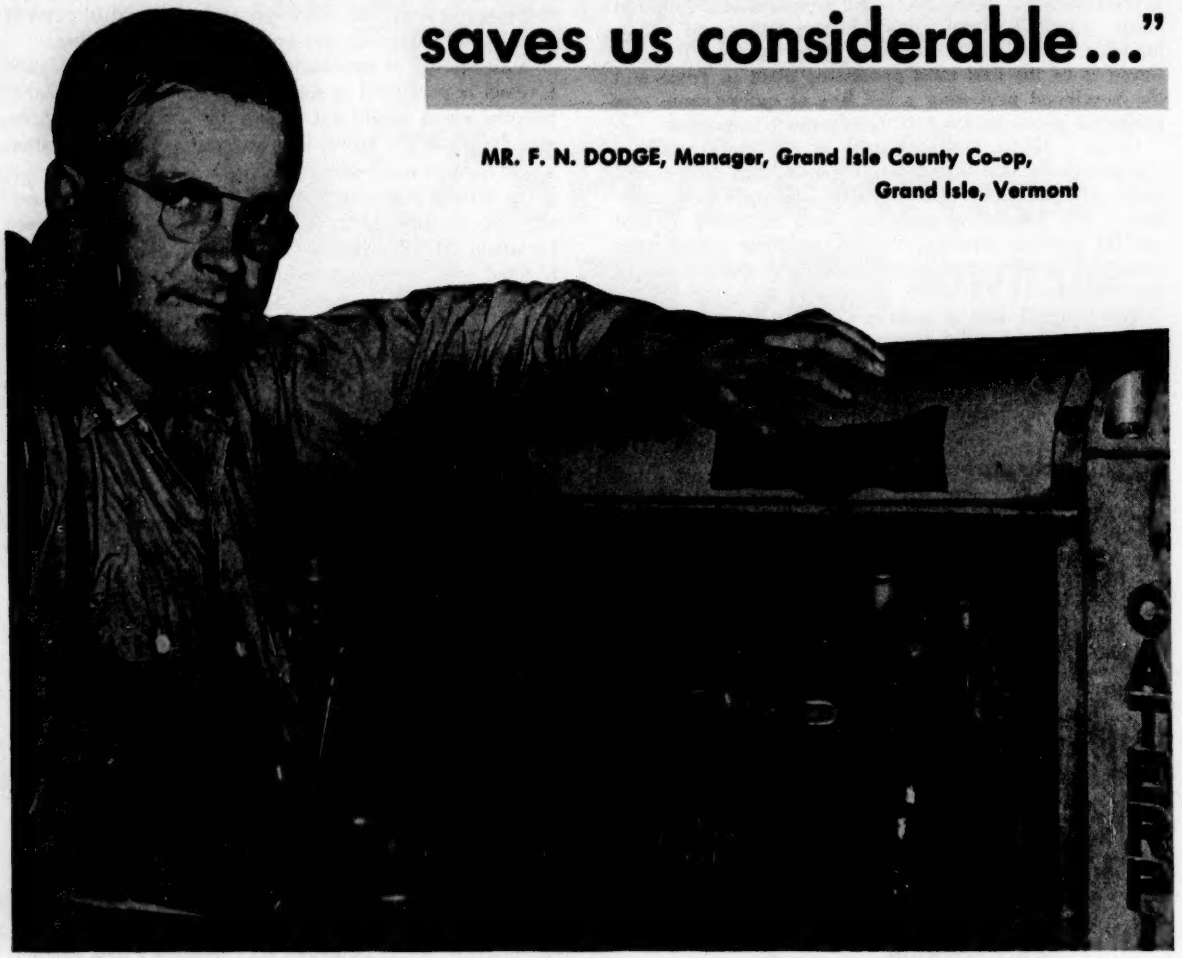
THE ATLANTIC Co. has completed plans for construction of a $300,000 to $400,000 addition to its plant at Knoxville, that will more than double its present cold storage capacity, it was announced by C. D. Castleberry, president. Mr. Castleberry said the addition will house the new freezer and cooler warehouses. This new construction will provide facilities not only for vegetables and poultry, but for all types of refrigerated merchandise, he added.

Citrus Concentrate Plants to be Improved

IMPROVEMENTS costing $1,250,000 have been announced by Clinton Foods Inc., Snow Crop division at its frozen citrus concentrate plants at Dunedin, Frostproof and Auburndale, Fla. Improvements will include modernizing evaporators, enlarging fruit storage facilities and adding more dryer facilities.

"It starts every day, operates OK and saves us considerable..."

MR. F. N. DODGE, Manager, Grand Isle County Co-op, Grand Isle, Vermont



THIS Cat* D315 Engine powers the ammonia compressor in the Grand Isle County Co-op. It works 6½ hours a day, 30 days a month, all year round. Summing up its performance, Manager Dodge gets right down to the fundamentals that add up to profitable production in *any* plant.

Notice he says: "saves us considerable." That's in comparison with electrical power in the area. How about comparison with other engines? You'll find the answer in records that show this again and again: Caterpillar Diesels do *more* work at *lower* cost with *less* down time than competitive units!

Here are some reasons why: These rugged yellow engines work day after day with a minimum of attention. They use low-cost No. 2 furnace oil without fouling — a factor that means cheaper fuel, less of it and less maintenance. What's more, they're honestly rated. You know before you install one that it will deliver the power stated on the specification sheet. And you have the choice of just the right amount of power for your needs — engines and electric sets in 12 sizes up to 500 HP and 315 KW.

Get the facts about them from your nearby Caterpillar Dealer. You can count on him for reliable information. You can also count on him for prompt service whenever you need it. Ask him to show you how Cat power can pay off for you!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

USE CAT POWER FOR PROFITABLE PERFORMANCE

In the Spotlight

REFRIGERATION in industry is necessary to meet the needs for precision and speedy production, expanded by the tremendous growth of manufacturing in America since the beginning of this century. It is needed not only as a preservative of products, but also as an agent or aid in the manufacturing process. A survey of this phase of the refrigerating industry is presented in the article starting on page 15.

THE GROWING Necessity for qualified operating engineers in the refrigeration industry has been emphasized by the industrial expansion over the last ten years, high-lighted by the fact that in 1952 industry was short 60,000 engineers in the United States. The subject is covered in detail in the article on page 19.

VENDING ICE has brought a new look and more sales for ice men in all parts of the United States. The policy of providing ice to people where and when they want it and in the form they want it, is paying off as shown by A. W. Gordon, Jr., of Omaha whose story is told in the article starting on page 23.

DRY ICE is a commercial product of considerable importance as a refrigerating adjunct in the preservation of foods. The production of this product requires an elaborate system of equipment. How it is done is told in text and pictures in the article starting on page 30.

RESEARCH in temperatures near absolute zero is beginning to pay off in industry. Previously of prime interest to scientists engaged in pure research, some principles of these studies have been put to practical use in industry See page 45.

SALES OF ICE in 1953 amounted to a total of 32,233,966 tons, a decrease of 4.46 percent from 1952, according to report of a survey made by the National Association of Ice Industries. Because of increased sales of processed ice at higher prices, revenue per ton showed a sizable increase. Detailed figures are given in the report which is summarized on page 28.

THE AIR CONDITIONED Chicago Greyhound bus station, opened in March 1953 attracted more than two million travelers during its first year of operation. The entire waiting room area, the arcades and all stores in this 10 million dollar project are air conditioned. For description and pictures see article on page 32.

PRECISION CONTROL of heat treating operations and hardening is essential to production of aluminum alloy parts of high tensile strength and corrosion resistance for Stratojet Bombers. Although the answer lies largely in the design of the plane, it is the strength provided by stronger aluminum alloys that makes possible the amazing performance. How this is accomplished is told in the article on page 42.

PLANS are progressing according to schedule for the forty-fifth annual meeting of the National Association Practical Refrigerating Engineers to be held at New Orleans, La., November 2-4. There will be twelve engineering sessions. A field trip to a nearby sugar refinery will show the latest applications of refrigeration to sugar refining. For the ladies there will be an elaborate schedule of sight-seeing, teas, shows, river boat excursion and shopping trips. For additional details, see article on page 40.

DEFROSTING low temperature forced convection evaporators may be accomplished with ordinary tap water without too much induced heat. This is done by introducing the water evenly over the entire coil and then draining it rapidly. Details of the process are discussed in the article on page 33.

SHAFT ALIGNMENT instructions are detailed in two answers to Problem 1007 Question Box, NAPRE, assistance being contributed by service and training engineers of two large manufacturers. A pipe vibration problem is answered by "cut and try." Repair of large castings is discussed, on page 38.

THE NINTH International Congress of Refrigeration will be held at Paris, France, August 31 to September 15, 1955, returning to that city after an interval of nearly fifty years since the first International Congress in 1908. Preliminary details of the arrangements for the meeting are given in the article on page 50.

RAILROADS are trying to win a bigger part of the fast-growing frozen food industry traffic by putting into service mechanically refrigerated cars. There are now 533 refrigerator cars in service and nearly as many are being built or on order.

Donald Duck Meets Iceman

IN HIS syndicated animated strip which appeared in the papers May 24, Walt Disney showed Donald Duck with the ice trays in his mechanical refrigerator frozen solid because the kids had tampered with the controls.

In his usual explosive manner, Donald tried to pull out a tray. When the handle came off he went through the front window and landed in the yard just as the Iceman was passing. In the last picture in the strip Donald was escorting the Iceman in with a big piece of Ice.

EXPERTS LIKE TO DO BUSINESS WITH EXPERTS

RATH CHOOSES CARRIER AMMONIA REFRIGERATION

Since 1925 The Rath Packing Company, expert at food processing, has called on Carrier's experts for its air conditioning and refrigeration requirements. Rath recently bought their fourth Carrier Centrifugal Refrigerating Machine. Carrier equipment at Rath's Waterloo, Iowa, headquarters now includes: 3 centrifugal ammonia condensing machines, 1 ammonia centrifugal compressor, 70 cold diffusers and 2 complete air conditioning systems for the general offices.

Carrier ammonia refrigerating equipment is on the job in food processing plants, large and small, all over the world—serving companies like Dole Pineapple, Honolulu; United States Cold Storage Corporation, Omaha, Neb.; Merchants Refrigerating Company, Hopkins, Minn.

May we assist *you?*

Whether you need a complete ammonia refrigerating system or a single machine, bring your problem to Carrier's experts. Call your nearest Carrier office. Or write direct to Carrier Corporation, Syracuse, New York.

ammonia refrigerating systems

Carrier

REFRIGERATION USES IN INDUSTRY

New needs of industry for precision and speedy production has created expanding use of refrigeration as an essential part of producing a growing number of manufactured commodities.

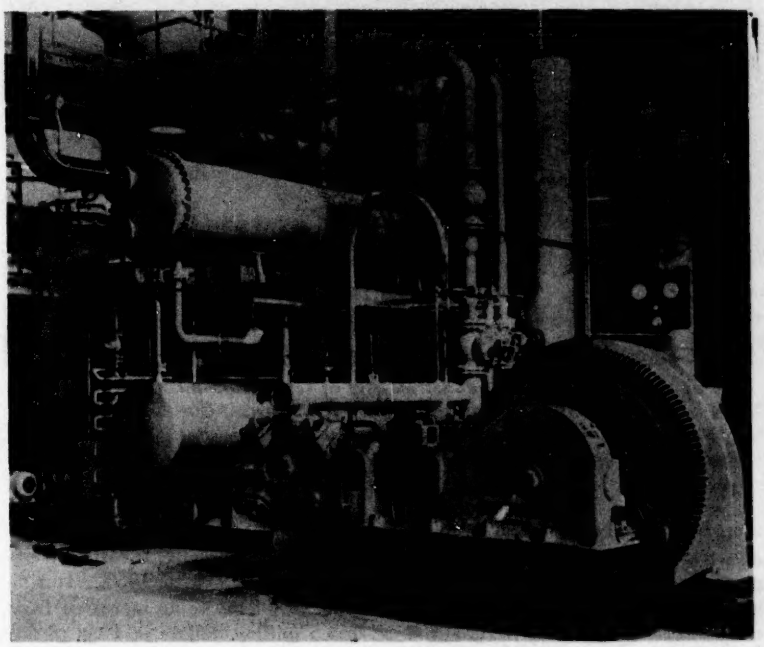
EDGAR R. CURRY
Managing Editor
Industrial Refrigeration

THE tremendous growth of manufacturing in America since the beginning of this century has brought new requirements of precision, speedy production, and accuracy, to attain which industry has been turning more and more to the use of refrigeration, not only as a preservative of products, but as an agent or aid in the manufacturing process.

Industrial refrigeration is not new; in fact nearly 40 years ago the Ice and Refrigeration Blue Book, published by *Ice and Refrigeration*, predecessor of INDUSTRIAL REFRIGERATION, listed 137 processes using refrigeration, most of which were for industrial use, aside from its original utilization for preserving foods and beverages.

Since then the industrial refrigeration field has been greatly amplified, with wider application in industries active at that time, and the addition of many that had not yet been heard of. Of particular interest is the fact that recent expansion has been in new applications, and this together with increased refrigeration of foods, air conditioning and other fields that might be called standard, has brought about a remarkable increase. Examples of these new and additional uses, as of today, would cover a wide range.

Recent issues of INDUSTRIAL REFRIGERATION have carried illustrated feature articles on: Modern brewery refrigeration (September, 1953) Candy storage (September, 1953) Synthetic rubber manufacture (October, 1953) Low temperature refrigerator cars (October, 1953) Subzero holding rooms in aircraft plants (October, 1953) Production of liquefied gases (November, 1953) Air conditioning in textile plants (December, 1953) Freezing bread in commercial bakeries (February, 1954) Production of chemicals (March, 1954) Chilling concrete mix in dam construction (April, 1954) Use of Dry Ice by machine shops (May, 1954)



Ammonia Compressor in plant of Minute Maid Corp., Orange Juice Concentrators, Plymouth, Fla.

Industrial Uses Of Refrigeration

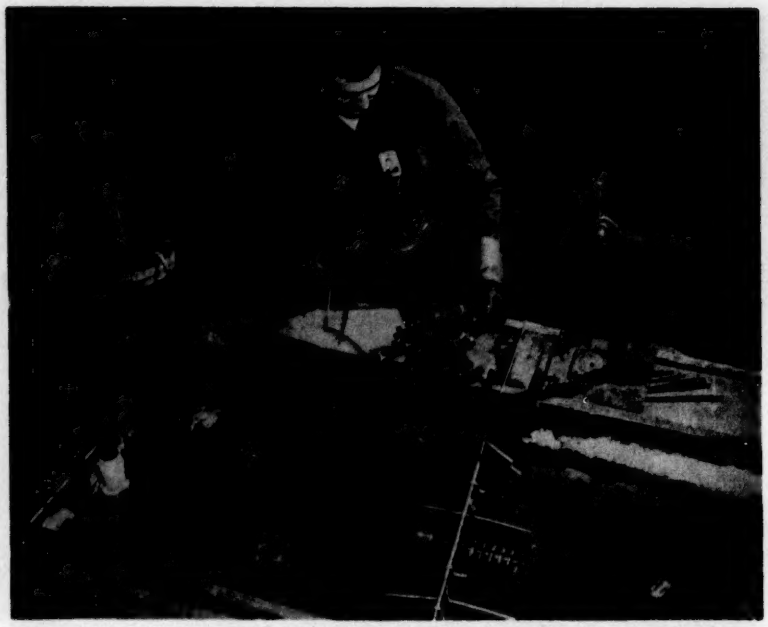
To include all the recognized and potential uses of refrigeration in industry would make a long list. In fact, there is hardly a manufacturing plant that does not make use of it in one form or another. Many of the manufactured products that are now considered commonplace and which are sold at a price within the reach of all, were made possible as a result of modern air conditioning in industrial plants, and other refrigerating processes.

A partial list of the more important would include textile and printing plants, machine parts manufacturers, the glass industry, mining and metals, steel making, machine tools and metal working, aircraft, automotive equipment, electrical products, plastics, synthetic and natural rubber, textiles, nylon and rayon, communications, pharmaceuticals, chemicals, civilian defense, bombsight storage and repair, atomic fission, research and development, laboratories, drafting, testing, celestial navigation, ammunition and explosives, petroleum products, lubricants other than petroleum, opticals, paper and paper products, photographic equipment and materials, precision and scientific instruments, shipbuilding, military clothing storage, parachute drying and storage, aviation control towers, fisheries, engine test buildings, armament instrument maintenance and adjustment, instrument repair buildings, warships, submarines, hospital ships.

In pharmaceutical plants pills are made in air conditioned rooms to control the quality of the coating applied. Air conditioning of all areas where sterile operations are performed is almost a "must."

In the manufacture of ball bearings, air is held at 34 to 36 percent relative humidity and 74 F temperature for the final inspection and packing areas.

In the manufacture of hard candy



One of the more ingenious industrial uses of refrigeration is in freezing mercury to make forms for casting intricate metal parts. Chilled to minus 100 F., the mercury forms are dipped in a ceramic slurry until a ceramic shell of sufficient thickness for mold use is obtained. (Photo courtesy of DuPont Co.)

temperature is held from 75 to 80 F and relative humidity from 30 to 40 percent. In the production of chocolates, temperatures in the hand-dipping room vary from 60 to 65 F and relative humidity from 50 to 55 percent. Chewing gum is made in rooms held at 77 F and 33 percent relative humidity.

For precision machining, particularly in special assemble rooms, temperature is from 75 to 80 F and the relative humidity from 35 to 50 percent.

Thermo-setting moulding compounds (plastic industry) are handled in rooms of 80 F and 25 to 30 percent relative humidity.

During the production of cigars and cigarettes, the air temperature is from 70 to 75 F and the humidity from 55 to 65 percent. During the softening of tobacco, the temperature is 90 F and the humidity from 85 to 88 percent; stemming or stripping 75 to 85 F and 70 to 75 relative humidity.

Statistics

Turning briefly to statistics, the table with this article shows the value of manufacturers' shipments of commercial and industrial refrigeration and air conditioning equipment, exclusive of household refrigerators and home freezers, for the twelve years from 1938 to 1950. During that period the value increased from 163.5 million dollars in 1938 to 639 million dollars in 1950.

Another illustration is shown in the tabulation of some common temperatures in the refrigerating industry, which include many applications of industrial refrigeration.

VALUE OF MANUFACTURERS' SHIPMENTS OF COMMERCIAL AND INDUSTRIAL REFRIGERATION AND AIR CONDITIONING INDUSTRY.

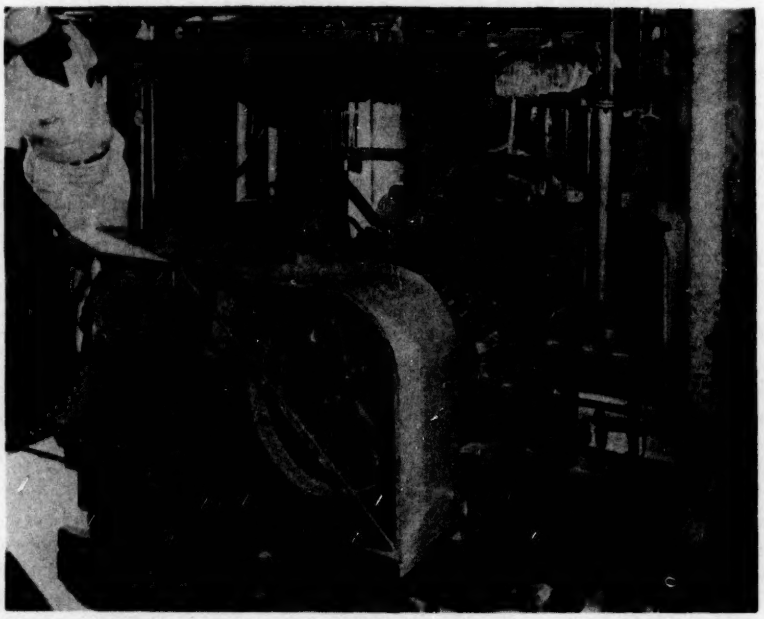
1938	$163,500,000
1939	179,500,000
1940	306,100,000
1941	208,500,000
1942	140,700,000
1943	161,000,000
1944	158,000,000
1945	232,600,000
1946	375,800,000
1947	657,700,000
1948	587,500,000
1949	497,100,000
1950	639,000,000

Excluding household refrigerators and home freezers.

Estimates based on U. S. Bureau of the Census and industry statistical reports; issued by Air Conditioning and Refrigerating Machinery Association.

Low Temperatures

Perhaps the most recent manifestation of the increasing use of refrigeration is the use of low temperatures. Research at temperatures near absolute zero (minus 460 F) is beginning to pay off industrially. For instance Helium is available for the industrial storage of liquid air, oxygen, nitrogen and hydrogen at tem-



Here's some of the refrigeration equipment installed at the plant of Godchaux Sugars, Inc., near New Orleans, where air-conditioning has both production and packaging problems that formerly existed due to high humidity. (Photo courtesy of DuPont Co.)

peratures down to minus 420 F. Oxygen can be both liquefied and transported and stored for extended periods, as might be required for submarine or rocket use without measurable loss through evaporation, using liquid helium as a refrigerant. Another application of ultra-low temperatures now being considered is the upgrading of natural gas. By liquefying it nitrogen and other combustible gases can be vented off. Hydrogen which has a lower boiling point than other components can be separated with low-temperature condensation. For vacuum work, vapors may be pumped faster by exposing them to a cold surface. Since pure Helium is not radioactive it is especially useful as a coolant where radioactivity is present.

Hardening and tempering of machine tool steel once required years of seasoning. Now it's done in a matter of hours by a low-temperature treatment, as shown here. Temperature in the cabinet is minus 120 F. (Photo courtesy of DuPont Co.)

Installations Using Industrial Refrigeration

The D. L. Clark Company, Pittsburgh, Pa., was founded in 1880 for the manufacture of candy. Refrigeration is used primarily for air conditioning, but also for cold storage. For example in the rooms where candy bars are manufactured, the newly formed bars have to be cooled before they can be wrapped.

The Edwin Guth Company, founded in St. Louis more than 50 years ago, manufactures a line of lighting fixtures. In this plant an electrolytic solution, under license from the Aluminum Company of America, is used for brightening the aluminum rejectors. Refrigerating units are used to cool water which is circulated through coils in the solution tank to control the temperature within plus or minus two degrees.

Standard Brands operates a modern plant in Atlanta, Ga. for making Blue Bonnet margarine and salad dressing. Process plants of this type require considerable refrigeration for the direct expansion votators, pasteurizers, and refrigerated rooms. Two large ammonia compressors and a complete refrigeration system are used. Both compressors are equipped with 50 percent capacity-reduction controls. The 10 by 10 machine operates at 30 lb. suction pressure, and the 9 by 9 at 12 lb., when required. A synchronous motor of 125 hp. drives the 10 by 10 at 360 rpm; a similar motor of 100 hp, also with top-mounted exciter, turns the 9 by 9 at 400. Two all-galvanized evaporative condensers, having a capacity of 60 tons each, are used.

Seven ceiling-type air cooling units, equipped with thermal expansion valves, are used in the rooms. These have finned tubing and three-way water valves for defrosting. Four of these units are installed in the large margarine storage room, two in the patty room, and one in the tempering room.

An "Instant" cooler chills 100 gpm of water from 58 to 50 F., for use in the pasteurizers. This is a galvanized cooler, 13 pipes wide by 4 pipes high, and was furnished completely assembled in an insulated housing.

The Baking Industry

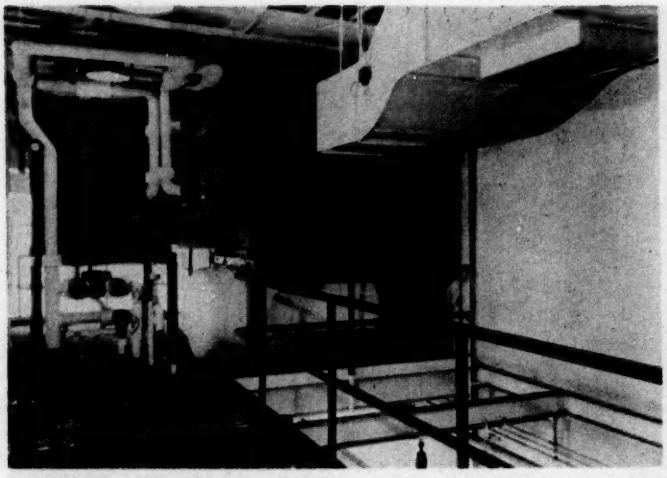
The baking industry depends heavily on air conditioning for a sanitary product. Controlled temperature also prevents the formation of crust and eliminates cracking and mold, which are among the most costly and troublesome hazards in the manufacture of bread. To retain taste, quality and freshness, bread must be cooled as rapidly as possible after baking, and this is accomplished by air conditioning the bread rooms.

Through the use of mechanical dough mixers and dough retarders, refrigeration has been responsible for large savings in production costs in modern baking practice. Wastes resulting from the production of too much dough having been eliminated by the refrigerated dough retarder. Dough sufficient for several days baking can be prepared at one time and stored at the desired point in the production schedule. Also through the use of commercial refrigeration, semi-finished and finished bakery goods can be stored for extended periods without losing freshness or quality.

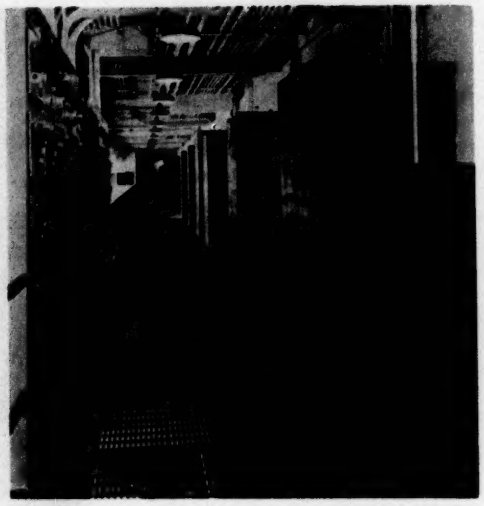
Synthetic Rubber

The production of synthetic rubber, using the "cold" process at 41 F makes a rubber that is much stronger and more resistant to abrasion. In fact cold rubber often excels natural rubber, particularly for automobile tires, insulation on wires, and other uses. But there was a time lag in transferring the solution from the reactors. To meet this an improved system of direct expansion ammonia coils inside the reactors has been developed that cuts reaction time to less than half the former nine hours. This has been very successful, to the extent that a glowing prognostication is made that so much synthetic rubber will be made that it can be used for paving streets.

Test laboratories of various industrial concerns are used for improvement of product and finding new ways of manufacture. One of these, the test chamber at Goodyear Aircraft Company, is equipped to maintain temperatures as low as



Climate changers provide ventilation and heating for Western Electric's electroforming plant, Baltimore, Md.



Copper Oxide rectifiers in around-the-clock operation are cooled by Trane Coils in Point Breeze Works of Western Electric Co., Baltimore, Md.

minus 100 F. The clear inside area measures 9 ft. long by 7 ft. wide, and is 7 ft. high. This test room is refrigerated with a 3-stage system handling Freon-22. The low pressure gas is drawn first into a pair of 9-cylinder compressors, which discharge through intercoolers to a 6-cylinder machine of the same type. The high-stage work is done by a 6 by 6 enclosed compressor operating at 360 rpm and equipped with bonnets on the valves. This test chamber is used chiefly for research on electric component parts manufactured for various government defense programs.

A large plant on a 480-acre site near Yazoo City, Miss., makes, among other things, liquid ammonia for agricultural use. To keep the pressure within the two storage spheres, each holding 1,000 tons, at a reasonable figure, the ammonia gas formed at the top is constantly drawn off by three 5 x 5 compressors.

Atomic Energy

The Atomic energy plant at Oak Ridge, Tenn. uses a number of refrigerating plants in the manufacturing process. The gaseous diffusion plant in which Uranium-235 is produced, and the electromagnetic plant each use a number of ammonia compressors for laboratory air conditioning. In the biology laboratory refrigeration units maintain the constant low temperature necessary to preserve blood plasma and the internal organs of animals that have been exposed to radiation. Other refrigerators are used to store various cultures, such as bacteria, and in some cases as incubators for germ and bacteria cultures.

The refrigeration system operated by the Celanese Corp. of America at Amcelle, Md., is one of the largest in existence, having a total capacity of over 10,000 tons. The enormous load is divided between the cooling of brine and of water, as is carried at four temperature levels: very cold brine at minus 15 F, brine at plus 25 F, water at 40, and water at 45 F. The water at 45 F is used for air conditioning, this part of the load being nearly 4000 tons.

The equipment chills brine within very close limits in a battery of huge shell-and-tube coolers, each 68 inches in diameter. A row of condensers stands outside the machine room, which is one of the largest of its kind in the country.

Chemicals molded into cylinders with holes through the middle are easy to handle yet have large enough surface area to be quick melting. A machine has been adapted to the tube-molding of p-dichlorobenzene, maleic anhydride and other chemicals. In addition to high purity, large savings have been affected in labor costs and floor space. Seven major chemical concerns are using this machine on a commercial scale. One company has found that in the process of freezing extremely pure p-dichlorobenzene they can also recover almost pure ortho isomer. In addition others are pilot-plant testing such possible applications as the molding of various waxes and plastics.

Dam Construction

In the construction of dams and similar projects involving large masses of concrete, the use of ice and cold water to lower and control the temperature of the components of the mix is of comparatively recent origin. The removal of excess heat by the ice before the concrete is introduced in the structure reduces the rate of heat generation caused by the chemical reactions of setting in the early stages and facilitates control of the temperature rise. By this means, internal temperatures are kept within safe limits during the critical curing period and maximum durability and safety of the structure are assured. Ice making machinery served in the construction of such outstanding projects as Fort Gibson Dam, near Muskogee, Okla.; Davis Dam, near Boulder City, Nevada; Whitney Dam, Whitney, Texas; McNary Dam, Plymouth, Washington; and Bull Shoals Dam in North Central Arkansas.

The refrigeration installation at the Bull Shoals Dam in the North Central part of Arkansas cost slightly less than $350,000. Approximately 25 percent of this figure, or $87,500, was allocated to force cooling at the lifts. In other words, this was for refrigeration employed in the dam structure itself after the precooled concrete had been prepared.

Three ice machine units at the Davis Dam provided approximately 60 tons of crushed ice per day, and three larger units with total capacity of 180 tons per day were used at the Fort Gibson Dam.

Concrete Construction

The prime importance of temperature control on concrete structures is to keep cracking to a minimum. However, important as the temperature control of concrete may be, it has been recognized from past experience that temperature control will only serve to control cracking if a continuous and systematic placing schedule is maintained. Furthermore, the rate of concrete placement within a lift should be such that it will prevent the loss of any "cold" introduced.

There are basically two approaches for providing refrigeration for such construction. One is by the use of refrigerated water and/or ice, the other by utilizing cold air.

Petroleum Industry

Double-pipe crystallizers in either a continuous or semi-continuous fashion are used in the petroleum industry to separate wax from oil. Representative of this type of equipment is a crystallizer in which the coolant is circulated through the jacket in spiral form. The standard diameter is two feet and the length ten feet, giving a heat transfer surface per section of approximately 60 square feet.

Solvent refining facilities for lubricating oil manufacture were recently placed in operation at Sohio's refinery at Lima, Ohio. The dewaxing chillers in this plant are nested-type double-pipe. Each section contains seven six-inch tubes inside a single shell filled with propane refrigerant. Wax deposits inside the tubes are removed by rotary scraper blades, driven by a chain drive.

Photo-Film

The manufacture of photo film is a delicate process and the chemicals used in its production must be of the highest quality and purity. Heat exchange equipment used in the process must be kept clean and be easily cleanable and must respond to accurate temperature control within very close limits.

To meet this controlled temperature problem in the film plant of The Ansco Division of General Aniline & Film Corp. Binghamton, N.Y., steam distribution coils were installed to heat the air entering a portion of film-base casting machines, selected for their non-freeze and good temperature distribution characteristics. In addition, special coils for brine service were installed in the condensing towers. These all-welded coils were constructed of special metals and had vapor tight casings.

An important part is taken by refrigeration in the process of Electroforming, the name given the method used for depositing copper electrically on steel wire to form the conductor for telephone drop wire.

The term electroforming differentiates between the usual light copper plating and the strictly functional application in which large quantities of copper are applied on steel wire. Expected production at the Point Breeze Works of the General Electric

(Continued on page 20)

Growing Necessity for Qualified Operating Engineers

EXPANSION of the industry in the past 10 years at a rate that involved over a third billion dollars in refrigeration equipment, would indicate considerable demand for qualified engineers, and there is. However, industry apparently has overlooked training of competent and reliable operators.

At the professional level, in 1952, we were short 60,000 engineers in the U. S. Our estimated needs are 30,000 per annum. In '52, engineering colleges graduated only 25,000 and at the end of this spring term in 1954 there were only 12,000.

This is not an apparent declining interest in engineering, but failure to interest young men in engineering at the rate of the profession's expansion.

What has occurred, is an upgrading of practical engineers and personnel of lesser technical education and experience. Further, it has resulted in proselyting between and within industries — personnel raiding, rather than job competition based on merit and qualification. Therefore, the ranks of qualified operating and maintenance engineers grows thinner.

On May 19, just passed, Professor H. G. Venemann, in a talk to operating management and manufacturers present at the reorganization of the Milwaukee Chapter, NAPRE, said: "Management is finding it more difficult every year to get good replacements for its engineering ranks. Many of the older engineers are dying off, others are sending their sons to college. But these sons upon graduation are getting better offers from other industries than the refrigeration industry is willing to pay, and do not try to fill the old man's shoes. Management is obliged to train its own engineers or resort to proselyting among themselves for experienced engineers. Otherwise they face the future with more numerous breakdowns, and with ever increasing costs for operation, for replacements and for maintenance.

This one-third of a billion dollars has gone into some very complicated and intricate equipment. Is the plant engineer of 20, 30 or 40 years ago capable of operating the high-speed, variable capacity compressor today? Has he been kept abreast of maintaining his automatic controls, or do you find them by-passed, and him valve-twisting? Does he do a reasonable amount of water-treating, equipment maintenance and repair, and his own annual overhauls? Or is the firm burdened with expensive service contracts "'cause the engineering personnel don't know"?

Many a manufacturer has been dismayed to learn that his latest and finest machinery, with hundreds of hours and thousands of dollars invested in research, tooling, production and run-in, has only resulted in dissatisfied customers. Why? It was answered in a couple of statements in that same talk by Venemann.

"The success of a compressor or of any manufactured product depends not only upon how well it is made, but also upon how it is used and serviced. In other words, its success depends largely upon the operating engineer. He can very easily ruin an excellent piece of equipment, or operate it inefficiently. It is therefore in the interests of the manufacturers that they support the work of organizations, whose efforts are unselfishly devoted toward helping the operating engineer do a better job and to broaden his horizon."

Hold-over plates are used by the Sullivan Milk Products Company, Battle Creek, Mich., in working on the company's specialty — decorated ice cream.

Company at Baltimore, Md., will provide a total of 1,750,000,000 feet of wire per year.

The electrical heart of the Electroforming process is the 40 copper oxide rectifiers for the 50 channels of wire being coated. They convert alternating current to direct current and have an output capacity of 180,000 amperes. Each rectifier cabinet contains a cooling coil which keeps the unit from damaging itself with the high heat generated in its around-the-clock operation.

Aluminum

The new aluminum plant of the Kaiser Aluminum & Chemical Corp. at New Orleans has eighty radial 11-cylinder gas engine-generator units to furnish a part of the electricity needed. These gas engines generate some heat which has to be removed to prevent binding and seizure of moving parts. The solution was to adapt the principle of automotive engine cooling. In a completely closed circuit, jacket cooling water is pumped from one of the engines to the fluid cooler where it passes through three rows of fin-and-tube coils. A hugh 84-inch tube-axial fan draws air through the coils, cooling the jacket water that circulates inside.

The fluid coolers can take advantage of cooler night air and cool days to save electric power used by the fan motor, and at the same time obtain maximum cooling efficiency. When the temperature of the air entering the fluid cooler drops, the fan motor automatically shifts to second speed, reducing fan capacity to 39,000 cfm. This reduction keeps the design lubeoil temperature at a maximum of 145 F.

Newspaper Air Conditioned

To provide comfortable working conditions for its many employees the Milwaukee Sentinel decided on a five million dollar remodeling program following World War II which included air conditioning equipment. Because of Wisconsin's severe winters, heaters were installed throughout the plant. For cooling, cool water taken from the city water system is circulated through single serpentine arrangement coils.

The single serpentine arrangement was selected because the average water main temperature in Milwaukee is 55 F. In the news room, mechanical refrigeration and direct expansion cooling coils were selected to provide maximum cooling and dehumidification. In off season when heating or cooling is not required, to provide ventilation the equipment can handle 100 percent outside air.

Printing Plants

It is generally agreed that the efficiency of the modern printing plant can be increased through installation of a properly designed air conditioning system. Printing is an extremely complicated process. Paper, ink, photographic materials, plates, equipment, all are affected by atmospheric conditions which must be controlled. Since production methods differ in various plants, they present individual air conditioning problems. However, basic requirements remain similar.

Although extremes of temperature should be avoided in the plant, temperature control is of secondary importance. The chief function of the air conditioning system is the rigid control of humidity. This is important because both materials and equipment used in the printing industry are extremely sensitive to an excess of high or low humidity conditions.

A new 200-ton Cyclotron or "atom smasher" was completed at the University of Washington at Seattle last summer. Since just about all of the 300 kilowatts of electricity required to energize the oscillator are changed to heat, the project engineers had to find some way of carrying this heat off to the atmosphere. This heat is absorbed by the pill box section electrodes or dee-stems. These electrodes are jacketed in special metal containers which allow cooling water to flow around them.

The cooling water, flowing through many valved circuits into the jacket and around the dee-stems, absorbs the heat and is then pumped to the cooling tube coils of an evaporative cooler. Water flowing down over these cooling tube coils is evaporated by air drawn over the tubes through the action of two centrifugal fans mounted in the top of the evaporative cooler. As the water evaporates, it naturally imparts a cooling effect to the dee-stem cooling water inside of the tubes. After being properly cooled, the coolant is returned to the Cyclotron and the cycle begins over again.

Pharmaceuticals

One of the problems of pharmaceutical houses is to keep providing the best possible accommodations for the manufacture of these products. A specific problem that the designers and builders were faced with was that of providing an air conditioning system servicing about 100 zones and meeting many different requirements in process and comfort cooling.

Because operating conditions are so diverse and complex, and because many of these conditions require such fine control, more than 120 separate

air conditioning systems were required, ranging from comfort cooling to extremely complicated combinations of air conditioning equipment, chemical dehumidifiers, germicidal lamps and electrostatic precipitators.

Approximately 16,000 lineal feet (about three miles) of duct work was installed to move all the air which is handled through 2,377 supply and exhaust outlets at a rate of 2,810,000 cfm. Conditioned air is supplied at the rate of more than 1,220,000 cfm. Total refrigeration load is 4,000 tons, of which 1,050 tons comes from 40 F chilled water supplied by a centrifugal compressor. Most of the cooling equipment is supplied by 54 F well water.

Air for all systems enters through penthouses on the roof directly above the platforms supporting equipment. Air is first drawn through an oil bath filter, then through cleanable cooling coils and humidifiers during the cooling season. The cooled, humidified (50 percent relative humidity) air then passes through special serpentined reheat coils, leaves the fan and enters ducts to individual zones. Summer operation goes into effect at outside air temperatures above 54 F. Air for process cooling is brought to 10 percent RH in some instances. Temperature in each zone is controlled by a zone thermostat which is in turn controlled by a compensating thermostat acted on by the outside air temperature.

In a special process application, an evaporative cooler installed in a special antibiotics building supplies chilled water for certain manufacturing processes involved in making antibiotics like penicillin, streptomycin, aueromycin and so forth. And in the manufacturing of drugs and medicines in tablet form, specially built torridors, a blower type heating unit having centrifugal fans, extended surface heating coils and filters are used to supply and exhaust outside and recirculated hot air for tablet drying.

Automotive

A manufacturer of automotive electrical equipment, C. E. Niehoff & Company of Chicago has high speed coil winding machinery that winds hair-fine copper wire alternately with layers of plastic insulating material. To keep the plastic sheeting and other materials at the correct temperature and condition for speedy production an air conditioner heats, humidifies and filters the air and provides ventilation for the factory area.

The production of .50 caliber steel case ammunition at the Twin Cities Arsenal in Minneapolis, Minn. involves the utilization of a sodium chloride brine solution for quenching purposes. This solution is kept at a temperature of approximately 50 F by refrigeration equipment consisting of a compressor chiller unit and an evaporative condenser.

Cooling of Mines

The cooling of mines is desirable from both the owners' standpoint and from the viewpoint of the workmen. As greater depths are reached there is a tendency for rock temperatures to increase. Also most mines have a considerable seepage of water which results in the air in the lower levels becoming practically saturated. Practically all mines therefore have been provided with some form of mechanical ventilation and cooling equipment. These range all the way from simple ventilation to mechanical air conditioning.

The refrigerating effect may be in the form of chilled water circulation from a central plant, or direct expansion coil utilizing refrigerating equipment in the immediate vicinity. In case an installation necessitates a number of units, centrifugal refrigeration might be used with chilled water circulation to each of the individual units.

Petroleum and Petro-Chemicals

Approximately 45 percent of all the processes in the petroleum and petro-chemical field depend on refrigeration. In the past few years there has been a demand for solvent dewaxing as licensed by the Texaco Development Corp. for separation of wax-free oil from oil-free wax.

The solvent usually employed is a mixture of methyl-ethyl-ketone, benzol, and toluol. Normally, each of the solvents in the above mixture serves as follows: Benzol retains oil in complete solution at dewaxing temperature; methyl-ethyl-ketone acts as an antisolvent, preventing the wax from remaining in solution at the dewaxing temperature; the action of toluol is similar to that of benzol, but has the added advantage over benzol of preventing benzol crystals from forming at dewaxing temperature.

A typical flow of this type is as follows: The waxy oil-solvent charge mixture, consisting of oil stock to be dewaxed and solvent, is first chilled by water to approximately 110 F, then passed through 6 inch pipes of double-pipe scraped-surface exchangers, where it is cooled by exchange with cold dewaxed filtrate. Final chilling is obtained by passing the charge stock through the 6 inch pipes of direct-expansion inclined chilling machines also fitted with spring-loaded scrapers. The refrigerant may be either ammonia or a hydrocarbon.

After being chilled to the final desired temperature, the charge oil and solvent mixture enters the filter-feed tank, whence it is fed by gravity flow to rotary-type vacuum filters for the removal of wax. The wax-free filtrate solution or dewaxed filtrate is collected in the main filtrate receiver and is then pumped through the annular space of the double pipe exchangers to evaporators for recovery of solvent and further finishing of the oil. Refrigeration is utilized for cooling of the solvent, flue gas, and charge-stock mixture.

Rayon Manufacture

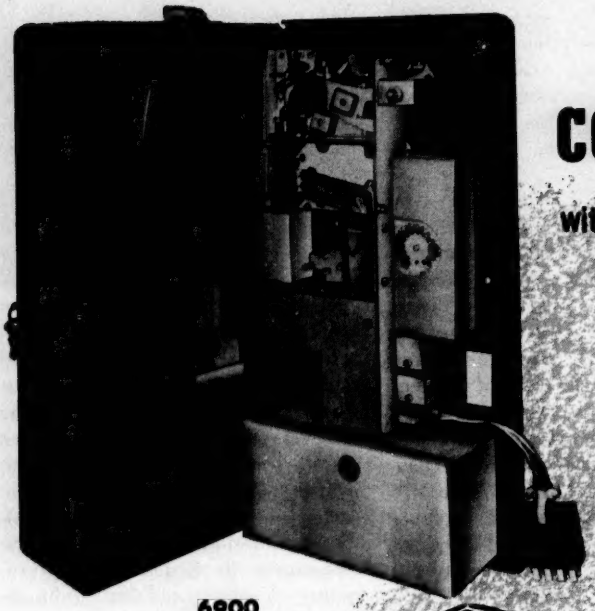
The manufacturing process at the plant of The Industrial Rayon Corp. Painesville, Ohio requires accurate temperature and humidity control. The system installed for this purpose makes this 14-acre plant completely air conditioned.

Rayon manufacture calls for the ultimate in clean air, and for precise control of temperature and humidity according to individual requirements of the various chemical and textile departments. Thus, by its very nature, the rayon industry has always been a leader in the applications of air conditioning. Industrial rayon goes the whole way, with complete air conditioning in all departments from front offices to shipping room.

Altogether, there are 13 complete air-conditioning units and two exhauster units ranging in size all the way from the immense No. 8 Unit (requiring 400 motor hp to drive its fans of 500,000 cfm capacity) down to the modest-sized No. 4 Unit, with one 5000-cfm fan driven by a 1.5 hp Motor.

Mr. Ice Vendor . . . here's your

Automatic Attendant!

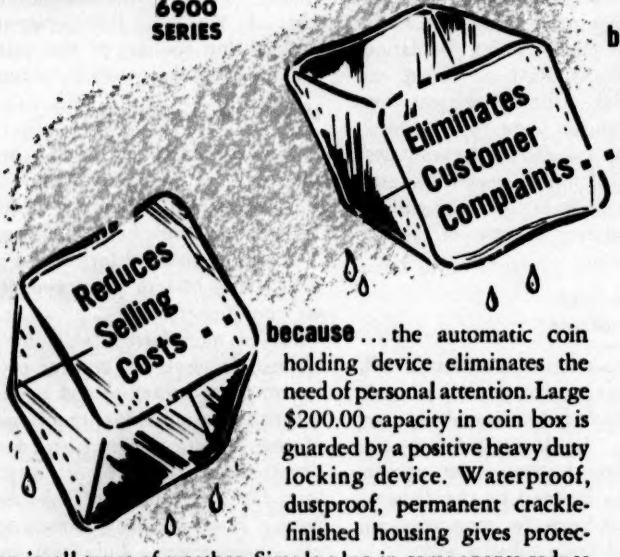


NATIONAL'S 1954
COIN ACCUMULATOR

with these big features:—

- **Coin Holding Device**
- **Weather-Proof**
- **Large Cash Box**
- **Plug-in Components**

6900 SERIES



because . . . the automatic coin holding device eliminates the need of personal attention. Large $200.00 capacity in coin box is guarded by a positive heavy duty locking device. Waterproof, dustproof, permanent crackle-finished housing gives protection in all types of weather. Simple plug-in components reduce installation and service costs.

Contact your vendor manufacturer or one of NATIONAL'S service offices.

because . . . the exclusive *escrow feature* holds all coins until the vend is completed. At any time prior to the sale, the coins may be returned to check for accuracy. Customer can change his mind after inserting partial cost of merchandise and no money is lost. Red light signals when machine is empty.

FRONT VIEW—
6900 SERIES

Designed to take quarters, dimes, and nickels in any sequence. (A unit can also be furnished for odd cent sales).

Liberal trade-in allowance on old equipment

Also available National's Control Box No. 4300-78A, designed especially for the National Accumulator. New unit controls length of vending cycle, has accurate counter and two convenient circuit-breakers for safety.

Comparison will prove there is no comparison

NATIONAL REJECTORS INC.

5100 San Francisco Ave. • St. Louis 15, Mo.
Phone COlfax 1-1900

ATLANTA 3, GEORGIA, 685 Peachtree St., N. E.—Phone: ELgin 4318
CHICAGO 39, ILL., 4007 W. Fullerton Ave.—Phone: NAtional 2-3614
DALLAS 5, TEXAS, 3202 Knox Street—Phone: JUstin 2201
LOS ANGELES 6, CALIF., 2300 West Pico Blvd.—Phone: DUnkirk 2-5772
TORONTO, ONTARIO, CAN., 1551a Eglinton Ave., West, Orchard 2985
WOODSIDE, L. ISLAND, N. Y., 39-39 61st St.—Phone: Illinois 6-5382

He Put Ice Business On The "Right Side of The Tracks"

Vending Prepared Ice Returns Good Profit For This Omaha Merchandiser

AUTOMATIC vendors are today giving the "new look" to the ice business. In Omaha, A. W. Gordon, Jr. of The Finlay Ice Service Company has successfully proved that vendors offer a modern, merchandising method for selling more ice to more people.

"Tinner" Gordon, nicknamed thus because his father was in the can business, is a relative newcomer in the ice business. Two years ago he was interested in buying Mr. Finlay's home in Omaha. But Mr. Finlay wanted to sell his business too so that he could move to Florida. When negotiations were completed, "Tinner" was the proud owner of the home . . . and The Finlay Ice Service Company.

Big Selling Job

A Dartmouth graduate, Gordon quickly realized that he had a big selling job to do. Many people considered the ice business as a "buggy-whip" kind of enterprise, fondly recalling the old-time ice wagon with its driver handing out chips to children on summer days. Convinced that "the public must be educated to the use of ice," Gordon eagerly studied the literature on automatic ice vendors. Naturally cautious in his new field, he was jolted into action when an ice vendor was installed in Omaha by a firm that wasn't even an ice manufacturer. Gordon's bank expressed confidence in the idea of automatic vending, and in May, 1953, he installed six vendors. Just one year later he purchased four more.

Gordon's ten Polar Processed Ice Vendors are located in strategic spots in Omaha, a city with a population of approximately 260,000. Seven of these vendors are single units which vend packages of cubed ice; two vend crushed ice, and the tenth vendor is a double unit dispensing a package of cubed ice on one side and a package of crushed ice on the other. The summertime ice manufacturing capacity of The Finlay Ice Service Company is about 80 tons per day. They are actually selling beyond capacity. Sales volume has risen 10 percent over Gordon's first year in business, and he claims that "80 percent of this increase is due to automatic vending." Vendor sales in June 1954, one month, were equal to 42 percent of the first year's total business, due to addition of four new vendors, and customer familiarity with locations and habit of using the vendors.

"TINNER" GORDON, a newcomer to the business, is delighted that the days of the iceman "sitting on the dock with gravy on his vest" are over. He is absolutely convinced that the consumer demand for ice offers a promising future for his industry IF the industry accepts the challenge of modern merchandising and service. To him the automatic vendor has been a real answer to the public's needs. It has brought an exciting glamour to an old-but-proud business. Its tremendous advantage of payment in cash will certainly aid the adoption of more vendors. Gordon's enthusiasm for these vendors is contagious. It is not mere excitement over a passing fad, but rather a strong realization that the vending machine offers the public ice when they want it at a place where they can easily get it. Gordon tells his story eagerly because he feels that anything that will help others sell more ice will indirectly benefit him. He also invites anyone who stops in Omaha to see his operation and discuss it with him. We salute "Tinner" Gordon of The Finlay Ice Service Company, a progressive man in the ice industry who is proving to the people of Omaha that ice is truly an "enjoyable addition to gracious living."

Selling Processed Ice

Although block ice does not require packaging and brings greater tonnage in sales, it still cannot command the price of cubed or crushed ice. Gordon realized too that in his climate it doesn't pay to sell greater tonnage at the lesser price. Selling block ice likewise requires considerably more refrigerated space. In a small station you can't carry a large enough load to make it pay. On the other hand, with the small processed ice vendors you can service many more locations for the cost of one big station. And, perhaps more important, you don't have all your eggs in one basket! Profitwise, the return is much greater in relation to the investment in larger stations. As discerning Gordon puts it, "Just having a large vending station doesn't mean one will sell more ice!" Selling processed ice has also assured good business the year around, including often-neglected evenings, Sundays, and holidays. The vendors create new business; retail sales at plant have *not* suffered.

Placement Of Finlay Ice Vendors

"One advantage of automatic vendors," claims this enterprising Omaha iceman, "is that you can put the ice business on the right side of the tracks. If the people won't come to your neighborhood, you can take it

to them!" Gordon's ten vendors are distributed location-wise so that most people in Omaha can conveniently buy ice. Eight of the vendors are located at filling stations and the other two at liquor stores, one of which is connected with a small line grocery. Filling stations are particularly effective locations with their convenient parking facilities. Good parking is a "must," and for that reason filling stations are the logical, and perhaps best, spots for vendors. Following the pattern of the super market, vendors should also be on the "going home" side of the street. All ten of Gordon's vendors are located on the busiest city thoroughfares, as close to other businesses as possible. His double unit on the main trans-continental highway gets tremendous tourist business and is also close to the best residential area. This vendor has perhaps the ideal type of location. Another vendor is working out well on a one-way street. Gordon was hesitant about placing it there even though it was a concentrated apartment area with a good shopping center nearby. After watching the traffic for a whole day, however, he decided that the cars managed to maneuver into stopping position when desired. Traffic rules were oftentimes broken, but the drivers got where they wanted to be. And this unusual location is paying off too!

Location Criteria

It is important to select locations, Gordon believes, that fulfill the following specific conditions:

1. The attendant must be alert, willing to make change for customers and fill the belts when necessary. It is also desirable to have an attendant available at least 18 hours a day. This eliminates constant trips merely to fill the belts. Attendant also calls plant when ice supply is low or machine is inoperative.

2. The vendor should be clearly visible. Personnel should not park their cars in front of it. Nothing should detract from the vendor itself. The poorest vendor location was the one where the attendant sold Christmas trees and later had flats of plants displayed for sale.

3. Nothing must be stored in the vendor but ice. There should be no cooling of pop or other beverages.

4. Locations must be well lighted at night. They should also have either crushed rock or a cement apron so customers do not get their feet wet or muddy.

5. Locations must be easily accessible for servicing by the ice company. It should not be necessary to ask customers to move cars so the vendor can be loaded. This inconvenience will cause your servicemen to neglect the vendor or it will entail too much time for reloading.

Sometimes it is necessary to move a vendor if the original location does not prove satisfactory. Gordon had one vendor where the parking and drive-in facilities were not adequate. He moved the vendor just one block away and this vendor doubled its sales volume the following month.

Effect Of Vendors On Filling Station Or Store's Business

Vendors often draw customers to the place where it is located. For example, at a filling station the customer might decide to buy gas. At a store he might buy picnic food, liquor, etc. With ice the drawing card the customer thus often makes other purchases. In addition to possible new customers, the station or store operator also receives 15% of the gross sales of the vendor. The operator does pay the power bill, a very small expense. (This eliminates the necessity of a separate or special line and separate meter on the ice station. Gordon pays the initial installation, and the vendors are manufactured ready for the power line to be run in.) But the bulk of the 15% commission check is extra profit to the station or store operator, so the venture is worthwhile to him too. (In a very poor ice business month, the commission check to one operator amounted to $30.50.) One filling station operator says if vendor creates one additional gas sale a day, it is worth while to have it on his property.

Advertising

Many ice people have forgotten that they have a product to sell. Conscious of the power of advertising, Gordon is enthusiastic in telling the public about his product. He asserts that vendors "have given the ice business something *new* to talk about." The response to his advertising has been excellent. Often people say to him, "Oh, are you the ice man with the vending machines? Let me shake your hand . . . at last we know where we can easily buy some ice!"

Advertising *locations* has proved especially helpful to Gordon's vendors. All locations are listed in the Omaha Classified Section of the phone book. All ads similarly list the various locations. *Product identification* is basic to his advertising. Bag printing (advertising on the bags of cubed and crushed ice) is essential. Gordon also has good identification on his trucks, all ice picks, canvas carrying bags, and in his ads. *Publications* that reach specialized groups have also been very effective media for advertising in Omaha, including the Community Playhouse magazine, the Junior League publication, the neighborhood newspaper published by two sixth graders, labor newspapers, school papers, etc.

Radio spots were put on the air by Gordon last year for three weeks. There were seven announcements a day on a station playing music continually. The "package deal" of 50 ads cost $62.50 per week. Again all locations of vendors were mentioned in each spot. This summer he has decided to continue the spots for 26 weeks, twice a day, advertising his crystal-clear ice cubes and crushed ice, mentioning locations. Also, a test of listenership is being made by giving a household hints booklet secured at the ice plant office.

House to House

Handbills are distributed to homes in the neighborhood of each vendor by scout troops, and the neighborhoods are thus saturated with literature. The filling station operators also receive a supply. *Book matches* are a very inexpensive, but effective, advertising idea for ice suppliers. Gordon's matches have a sketch of the vendor on the outside cover, with a complete list of locations on the inside cover. The matches cost Gordon only 3/10 of a cent apiece since the match manufacturer sells them to liquor stores, drug stores, or other stores where drink mixes are sold in his vicinity. These stores distribute the matches to their customers, potential buyers of ice. Then, for an extra charge, Gordon buys a supply of these matches for his own distribution.

Displays are combined with a merchandising idea for ice cubes. Cubes in plastic bags are displayed in drug store freezer cases. The store operator then has a supply of regular bags of ice in his ice cream storage cabinet in the basement. The drug stores buy the cubes at 50% of the market price. Signs on the store window and on the freezer case read, "Finlay's Ice Cubes For Summer Beverages For Sale Here." These drug outlets, while different from his vendors, also advertise and increase his sale of ice.

Size Of Package And Price

Cubes are sold in 7 lb. packages for 35 cents. This package contains approximately 84 cubes, 12 to a pound. The 7 lb. package is easy to handle and contains sufficient cubes for family entertaining or ordinary use. Crushed ice is sold in 12½ lb. bag for 50 cents. Gordon's theory on package size is that women (who seem to do much of the ice shopping) don't want to carry more than the 12½ lb. package. If a larger supply is needed, the customer doesn't hesitate to buy extra bags. An important part of the vendor's sale is convenience — both in location and in the size of the package. A stapling device fastens Gordon's bags in three spots — one on the first fold-down and the other two on the sides. Thus there are no protruding tops. This stapling method gives a good closure with strength to withstand handling and movement on the conveyor belts. It also assures a compact package.

Maintenance

Gordon's experience with the vendors from an operational standpoint has been excellent. He is

Top: This vendor located on a main highway and also close to very good residential section, so catches both transient and residential trade. This is a double unit, vending crushed ice on one side; cubes on the other.

Center: This automatic ice vendor is located in a spot where traffic is primarily homeward bound.

Bottom: This vendor located within a prosperous residential area.

—Photos courtesy Refrigeration Engineering Co.

convinced that vending machines require "less maintenance than any other piece of equipment in an ice operation." He keeps a whole coin mechanism and spare parts, such as fuses, on hand for emergency use. He has found that the vendors work well for customers too. The Finlay Ice Service Company has a policy of giving a customer a bag of ice free if the vendor doesn't dispense his ice properly or return his money. But in a year they have not had more than six complaints — and six free bags of ice given away!

Operating Costs

Depreciation on the vendors is figured at 20% per year over a 5-year period. The electric current charge, as explained earlier, is not paid by the ice company but rather by the individual operator out of his 15% commission check. There have been no maintenance costs to date, except for coin mechanism adjustments. With reference to his total investment, Gordon states that his ten machines will completely amortize themselves in 2½ years. This is after all operating costs, including taxes, insurance, depreciation and servicing expenses, have been deducted.

Gordon keeps a graph of his ten vendors to show operation costs and sales. From this record he can determine the best locations and consider moving stations not doing so well. During 8-months' time from May 1, 1953 to December 1, 1953, the gross receipts from the sale of ice at his best vendor exceeded the cost of the machine.

Profit

The case for processed ice is also an impressive one when the profit is considered. Here's how Gordon figures his profit!

There are 285 seven-pound packages of cubed ice per ton. Selling at 35 cents per bag, the total revenue per ton amounts to $99.75. (This compares with $20.00 revenue from one ton of block ice, composed of 80 twenty-five pound blocks selling at 1 cent a pound.) The break-down on manufacturer's costs to be deducted include the following:

Cost of ice	$ 2.50 per ton
Cost of printed bags and staples (allowing for destruction and spoilage)	8.55
Sacking labor @ 2c a bag	5.70
Delivery cost	2.85
Commission @ 15%	14.96
	$34.56

Deducting this total expense of $34.56 from the $99.75 total revenue per ton of processed ice, the gross profit of $65.19 per ton is determined.

Safety Story Told in Block of Ice

Ice delivery drivers of Southland Corp. Dallas, Tex., line up behind safety sign frozen in block of ice "Work safely. An injured man can't work." They are Elonzo Brooks, 7 years service; Charlie Griffin, 15 years; Arthur Barge, 9 years; James Lott, 34 years. These men take pride in their work and in maintaining a good safety record.

Special Sunday Paper Section Advertises Ice

A VERY attractive advertising piece was a special eight-page section of The St. Louis Post Dispatch Sunday May 23 telling about the various services offered by The City Products Corporation, including ice, fuel oil and coal.

The front page, in colors, shows a picture of one of the company's 87 automatic ice vending stations. Page two and three show photographs of the executive personnel, the division and branch managers and the sales force; and a map of St. Louis with location of vending stations, with the explanatory line, "There's one in your neighborhood."

Page four is on fuel oil and page five covers coal, in each case playing up an offer to fill the fuel oil tank or coal bin, with payment deferred until October.

Pages six, seven and eight revert to the ice story, with pictures on the process of making ice and very attractive pictures in color showing the many practical uses of ice cubes.

Ice Packed Poultry

AT the Fact Finding Conference of the Institute of American Poultry Industries held in Kansas City, Chester B. Franz of St. Louis put his finger on some potent points for iced poultry. Franz believes that the ice-packed poultry has four advantages: Better display possibilities and eye appeal; less shrinkage, carton cost, and generally lower handling and distributive costs, making possible a more attractive sales price; more sales promotional possibilities, since ice-packed fryers are generally handled in a meat department, where prices show up attractively compared with nearby beef and pork items; large volume sales of ice-packed fryers, which are common during periods of depressed prices, may be extremely valuable advertising and may well be a major factor that changed chickens from a Sunday dish to a daily menu item.

Louisiana Ice Plants Sold

ICE plants at Donaldsonville and Thibodaux, La., have been purchased from Central Louisiana Electric Co., New Iberia, La., by Sen. Elmore Bonin. Mr. Bonin owns the People's Ice Co., Lafayette; two plants in Abbeville; and refrigerated storage and sales offices at Erath, Breaux Bridge and Arnaudville.

Safety Record Improves in 1953

WORKERS employed by member companies of the National Safety Council had the safest year on record in 1953, bettering their previous record performance in 1952. They had fewer on-the-job accidents in 1953, and the ones they had were less serious. Industrial injury rates for last year, released by the Council in advance of the 1954 edition of its annual statistical yearbook, "Accident Facts," show a substantial reduction in both frequency and severity of 1953 accidents as compared with 1952. Thirty-four of the 40 basic industry classifications reduced their frequency rates, and 24 reduced severity rates.

The average accident frequency rate for employees in all industries submitting company reports to the Council, based on the number of disabling injuries per 1,000,000 man-hours, was 7.44 in 1953, a reduction of 11 per cent from the year before. The communication industry again led all others by turning in the lowest employee frequency rate. Its rate was 1.22 — a 10 per cent reduction. Electrical equipment ranked second with 2.88, followed by the automobile industry with 3.39. The relative positions of these industries was the same in 1952. Lumbering stayed at the bottom of the frequency list in 1953 with 33.71 rate, but this represented a 5 per cent reduction. Coal mining remained in the next to last position with 25.81. Mining, other than coal, was third from the bottom, just below marine transportation.

The average accident severity rate for all industries reporting to the Council, based on the number of days lost per 1,000 man-hours, was .83 last year, a decrease of 6 per cent from 1952. Communications also had the lowest severity rate, leading all other industries with a rate of .10 — an 8 per cent increase from 1952. Wholesale and retail trade slipped from second in 1952 to sixth in 1953, with tobacco moving from third to second. Electrical equipment was third.

Three industries had reductions in their severity rates of more than 50 per cent: air transport, 64 per cent; leather, 60 per cent, and storage and warehousing, 58 per cent. Frequency rate for storage and warehousing was 6.45, down one point. For meat packing the severity rate was .47, a reduction of 31 per cent and the frequency rate was 9.98, a reduction of one per cent.

In terms of severity, coal mining once more stayed at the bottom of the list, with the highest accident severity rate of 4.79, although this was a 23 per cent improvement. Quarrying, next to last in 1952, moved up ahead of mining (other than coal, and lumbering with a 46 per cent reduction.

Utility Tax Covers Refrigeration Service

THE refrigeration industry in Buffalo, N.Y. is affected by the city's new utility tax which went into effect July 1. City Comptroller Chester Kowal cited the following regulation as it affects the refrigeration industry:

"A charge for the rental of space in premises cooled by refrigeration, for the storage of goods in such premises, or for the use of storage facilities cooled by refrigeration, such as food lockers, is deemed a charge for rental storage or the use of such facilities, and not a charge for utility service.

"Where the purchaser has no exclusive control over a prescribed area within the premises cooled by refrigeration, a charge for the storage of goods in such premises or for the use of storage facilities is deemed a charge for utility service.

Polar Processed ICE VENDOR

- SELLS CUBED AND CRUSHED ICE
- OPENS NEW OUTLETS — INCREASES ICE SALES
- NOW AVAILABLE IN DOUBLE AND SINGLE MODELS
- SHIPPED ASSEMBLED AND WIRED — READY TO OPERATE

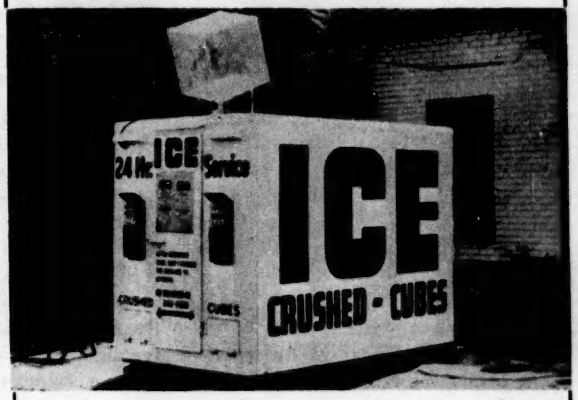


Photo: Model C-2 (Double Unit) POLAR Processed Ice Vendor. This unit sells handy packages of both cubed and crushed ice.

Conveyor Capacity (each belt) 40 10# bags
Storage Capacity 350 10# bags

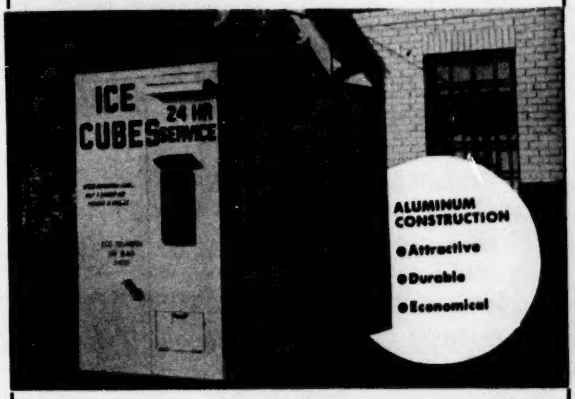


Photo: Model C-1 (Single Unit) POLAR Processed Ice Vendor. This unit sells one product.

Belt Capacity 40 10# bags
Storage Capacity 200 10# bags

The year 'round demand for processed ice is increasing! You can make cubed and crushed ice available in all convenient locations in your city with POLAR Processed Ice Vendors. The investment is surprisingly low!

Write or Wire Today for descriptive literature and prices. Dept. I-8.

REFRIGERATION ENGINEERING CO.
MONTGOMERY, MINNESOTA

32,233,966 Tons of Ice Sold in 1953

ALTHOUGH preliminary estimates indicated a possible drop off in ice sales for 1953 of as much as 10 to 12 percent, the annual survey of the National Association of Ice Industries showed only a decline of 4.46 percent under 1952 sales.

The summary of the annual survey is as follows:

1. Total Ice Sales — 32,233,966 tons — a decline of 4.46% from 1952.

2. Combined Sales of all Processed Ice — 4,724,249 tons; an increase over 1952 of 5.46%.

3. Ice Cube Sales totaled 759,213 tons; a decline of 3.33% from 1952.

4. Sized Ice Sales were 2,087,109 tons; an increase of 3.47%.

5. Crushed Ice Sales were 1,877,927 tons; a sharp increase of 11.96%.

6. The Load Factor of the operating plants was 41.28%; an increase of 1.10%.

7. The Natural Ice Industry accounted for only 70,916 tons — .22% of total sales; a decline of 39.94% from the previous year.

8. Total Daily Capacity of plants in operation was 213,919 tons; 7% below 1952.

9. Total Ice Storage Space in use in 1953 was 2,660,294 tons; approximately the same as for 1952.

10. Revenue Per Ton of companies reporting dollar income for 1953 was $7.53. This figure for the same companies for 1952 was $7.19.

Per Ton Revenue Increases

Executive Secretary Guy W. Jacobs reported that although the industry's tonnage showed a decline of 4.46 percent, per ton revenue for the companies reporting reflected a 9.55 percent increase.

Revenue per ton figures should not be confused with price schedules. The $7.19 and the $7.53 are the average dollars and cents per ton realized when a company's total ice dollar volume is divided by the tons of Ice sold. The sales include all types of ice sold and sales to all price schedule classifications. This increase in per ton revenue during 1953 was doubtless due to two factors: (1) Some increase in ice prices, and (2) The sale of more high-priced ice due to increased sales of processed ice.

One of the most interesting regional trends is that in the Southwestern Division. The Southwest has held its own tonnage-wise since 1949 in spite of its ups and downs. It suffered a decline in 1950 but recovered its loss in 1951. Consequently, the tonnage figure for 1953 is substantially the same as 1949.

Sized and Crushed Ice Sales Increase

The national gain in Cube tonnage in 1952 was lost in 1953. The upward trend of Sized Ice and Crushed Ice continued. Sized Ice volume went up another 3.47%, and Crushed Ice sales shot ahead of its 11.02% increase in 1952 with another increase of 11.96%. The most significant increases in sales of Crushed Ice were in the Southeastern and Great Lakes Divisions.

The percentage of companies offering Processed Ice service (Table III) showed slight changes which conform to the pattern of Processed Ice sales (Table II). The small decline in Cube sales was accompanied by a slight decline in companies offering the service. The gains in Sized Ice and Crushed Ice sales were accompanied by small increases in the percentage of companies offering the service.

As might be expected, the total daily production capacity declined. This decrease amounted to 16.102 tons or 7%. The decrease in capacity was accompanied by a slight increase of 1.10% in load factor.

TABLE 1—TOTAL ICE SALES IN UNITED STATES FROM 1951 THROUGH 1953

Division	1951 Tons	1951 % Change Over 1950	1952 Tons	1952 % Change Over 1951	1953 Tons	1953 % Change Over 1952
New England	1,692,702	+ .65	1,803,743	+6.56	1,677,301	−7.01
Eastern States	6,356,051	− 1.35	6,471,096	+1.81	6,066,005	−6.26
Southeastern	4,570,615	+ .16	4,512,111	−1.28	4,106,021	−9.00
Southern	2,608,750	− 1.52	2,440,225	−6.46	2,383,368	−2.33
Southwestern	4,828,050	+13.63	4,856,053	+ .58	4,768,158	−1.81
Great Lakes	5,641,360	− 5.36	5,546,021	−1.69	5,314,197	−4.18
Western	2,512,571	− 2.64	2,571,365	+2.34	2,603,307	+1.25
Mountain States	1,055,332	− .75	1,003,832	−4.88	1,076,710	+7.26
Pacific Coast	3,998,497	− 4.89	3,984,502	− .35	3,688,055	−7.44
Northwestern	525,574	+ 4.53	549,435	+4.54	550,644	+ .22
TOTAL U.S.	33,789,502	− .32	33,738,383	− .15	32,233,966	−4.46

TABLE 2—TOTAL ESTIMATED SALES OF PROCESSED ICE IN TONS

Division	Ice Cubes 1952	Ice Cubes 1953	Sized Ice 1952	Sized Ice 1953	Crushed Ice 1952	Crushed Ice 1953
New England	68,578	64,862	59,858	53,581	74,464	78,982
Eastern States	210,321	204,932	432,856	448,832	183,493	207,503
Southeastern	76,575	76,310	270,454	303,209	146,925	206,169
Southern	9,822	9,313	95,130	104,427	48,912	55,953
Southwestern	16,004	14,786	209,257	218,265	641,322	640,342
Great Lakes	173,459	163,781	495,217	489,755	227,734	315,568
Western	86,210	84,502	186,553	194,865	165,953	179,403
Mountain States	12,551	11,603	49,082	50,720	41,200	39,980
Pacific Coast	129,387	126,459	195,872	199,154	67,185	60,879
Northwestern	2,495	2,665	22,836	24,301	80,132	93,148
TOTAL U.S.	785,366	759,213	2,017,115	2,087,109	1,677,320	1,877,927
% Change Over Preceding Year		−3.33%		+3.47%		+11.96%

TABLE 3—PERCENTAGE OF COMPANIES PROVIDING PROCESSED ICE SERVICE

Division	Ice Cube Service 1952	Ice Cube Service 1953	Sized Ice Service 1952	Sized Ice Service 1953	Crushed Ice Service 1952	Crushed Ice Service 1953
New England	73.9%	76.5%	69.6%	64.7%	52.2%	47.0%
Eastern States	42.4%	41.5%	41.4%	42.8%	52.5%	50.6%
Southeastern	14.2%	13.8%	31.1%	33.3%	72.6%	77.0%
Southern	12.3%	9.1%	41.5%	36.4%	72.3%	70.9%
Southwestern	15.4%	14.8%	26.9%	35.2%	78.8%	70.4%
Great Lakes	55.3%	54.6%	52.4%	51.2%	55.3%	59.3%
Western	46.2%	43.3%	38.5%	48.3%	60.0%	63.3%
Mountain States	41.2%	64.3%	47.1%	64.3%	64.7%	71.4%
Pacific Coast	70.8%	66.7%	29.2%	29.2%	37.5%	37.5%
Northwestern	20.0%	15.4%	45.0%	53.8%	50.0%	46.1%
TOTAL U.S.	35.7%	34.9%	40.8%	42.7%	61.8%	62.6%

Book on Ice Carving

A BOOK on ice carving, "Ice Carving Professionally" has been written and published by George P. Weising, Fairfield, Conn. It is cloth bound, 352 pages with 120 full page photographs, sketches and illustrative lessons in the art of ice carving, plus subjects on coloring and welding ice, and suggested subjects. While Mr. Weising has an outstanding reputation as an ice carver, the directions are simple, enabling the beginner to progress satisfactorily from the beginning.

No Shortage of Butter Storage Space

THERE is no basis for the reports that a serious shortage of storage space for butter is developing, according to M. W. Young, president of the National Association of Refrigerated Warehouses.

Referring to reports that warehouses in one or two areas have been turning away butter, Mr. Young said that "if a space shortage exists in any area, it is a temporary condition and a local problem which does not apply nationally.

"The important fact to consider before jumping to conclusions," he said, "is that butter is usually stored near the area of production or point of ultimate disposition.

"Naturally, this influx may temporarily tax available storage facilities in these particular areas, until such time as the butter can be put into distribution channels or transported to other sections of the nation. Therefore, the actual problem is one of transportation rather than a shortage of storage space.

"NARW has affirmatively stated on numerous occasions," he emphasized, "that there is no over-all shortage —or potential shortage—of refrigerated warehousing space. And if a Government agency, or others, has difficulty in obtaining adequate space, the Association will make certain that space within a reasonable distance of the area desired will be located".

Quoting Department of Agriculture figures, Mr. Young pointed out that freezer occupancy as of *May 31, 1954* was 72 percent which indicates that ample space is available.

"Butter is stored at freezer temperature, zero degrees or below, and of the millions of pounds currently held in our public refrigerated warehouses, there has been no evidence of spoilage", he said.

Freezing Converts Sea Water Into Fresh

A NEW METHOD of converting sea water into fresh water by freezing and melting is being tested at the University of Washington. Dr. Thomas G. Thompson of the university's oceanography department, who developed the freezing-melting purifying technique with Kurt H. Nelson, a graduate student now at the University of Oklahoma, explained it this way: Freezing sea water removes about 75 to 80 percent of the salt and other minerals because these impurities do not freeze easily and settle to the bottom where they can be drained off.

What salt and minerals remain are mostly washed away when the frozen sludge or mush first starts to melt. The remainder, which constitutes about 30 percent of the original sea water, is pure enough to drink. The yield can be increased to 50 percent by refreezing the partly de-salted waste that first runs off from the controlled melt.

Dr. Thompson said results thus far have been promising. The next big question would be: Can it be made commercially feasible?

Harold M. Hendrickson, associate professor of mechanical engineering, says that theoretically the freezing-melting process would require only one sixth of the energy needed for distilling sea water, and would have less corrosion.

The Case Of:

THE FACE ON THE COLD ROOM DOOR

NO MYSTERY, really! Facts . . . cold facts, that's all! You see, the case on this Taylor Temperature dial is fume and moisture proof. It can be face or flush mounted, panel or field.

The dial is only 6" in diameter, but bold numerals and graduations make it easy to read at a glance.

Mercury, gas, Monolex* organic liquid or vapor actuated systems to fit nearly every type of application. Ranges from minus 125°F. to plus 1200°F.

New movement design minimizes linkage error, means more dependable accuracy throughout the range span. **Ideal for Brine Lines, Brine Tanks, Ammonia Lines, Cold Storage Rooms, Refrigerators, Bunker Rooms and Ice Cream Hardening Rooms.**

Also available for pressure and load measurement.

Ask your Taylor Field Engineer, or write for **Bulletin 98214.** Taylor Instrument Companies, Rochester, N.Y., or Toronto, Canada.

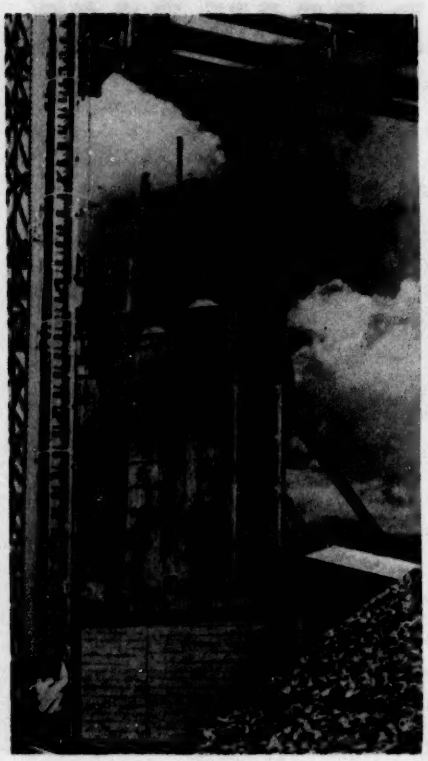
*Trade Mark

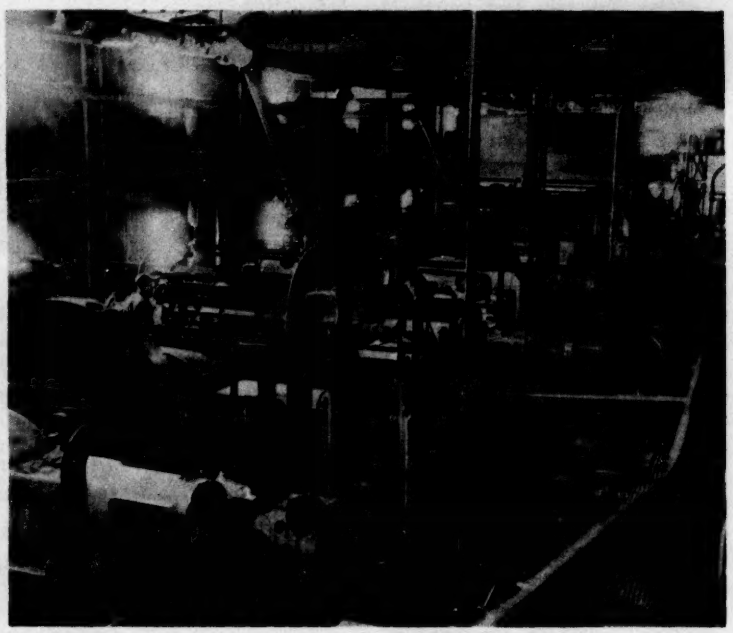
Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

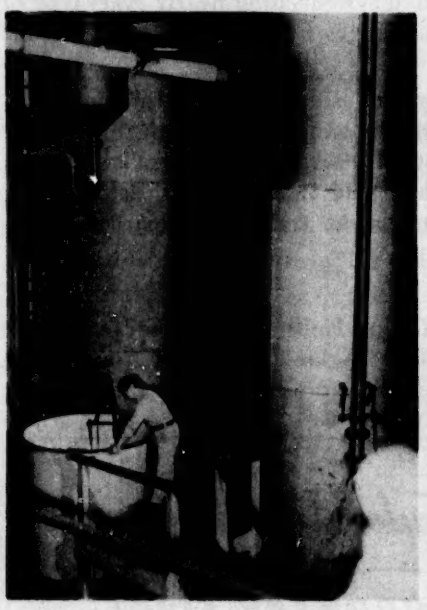
Producing Dry Ice

From Lime Kiln To Finished Blocks

(Pictures at Wyandotte Chemical Corp. Plant, Wyandotte, Mich.)







Dry Ice Production Line in Pictures: Upper Left: In these towering lime kilns at the South Plant carbon dioxide gas is produced for use at Wyandotte's Dry Ice Plant. Lower Left: Alongside huge scrubbers where odors are removed from CO_2, water supply equipment is checked. Upper Right: In these big compressors, carbon dioxide gas is compressed before being liquefied. Lower Right: Press operator pushes ice cake from press onto conveyor. Expanded, cooled and compressed under 2500 pounds pressure the gas has now become a solid block of Dry Ice.

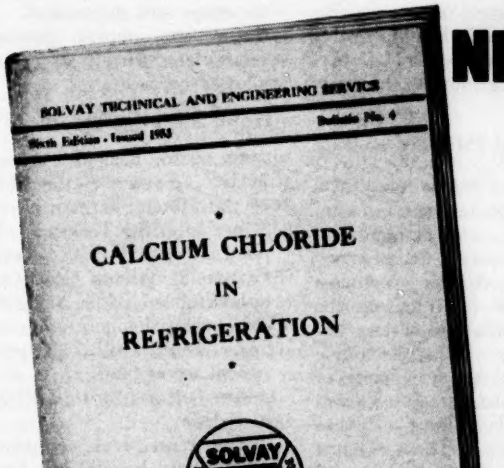
Left: Wrapper saws block of Dry Ice for shipment. Center: Another wrapper checks to see that ice is properly cut. Right: Ice is put in paper bags, after which the bag is sealed.

ALTHOUGH Dry Ice, solidified carbon dioxide, was known to the world well over a hundred years ago, it wasn't until 1928 that it was produced in sizable quantities in a commercial way. Shortly afterward, in 1930, the Wyandotte Chemicals Corporation entered the field and built an experimental unit. In 1932 a plant capable of producing 150 tons a day was constructed and put in operation, since enlarged until now it is one of the World's largest Dry Ice producing plants.

Carba Process Used

For producing Dry Ice, Wyandotte uses an adaptation of the Carba process, which was developed in Switzerland and originally produced Dry Ice without the use of presses, but with low capacity. Now, with the use of presses, output and efficiency have been increased. Essentially the process is simple, requiring a little over eleven minutes for a cake of Dry Ice to be formed.

(Continued on page 53)



It's Yours—At No Cost or Obligation

SEND FOR YOUR FREE BOOK TODAY

NEW REVISED EDITION!

The Most Complete, Informative Book in the Industry on:

Preparation—Strengthening—Maintenance of

CALCIUM CHLORIDE REFRIGERATION BRINE

LATEST EDITION CONTAINS:

- Most advanced, up-to-date tables
- New, additional information
- More complete data

SOLVAY Calcium Chloride

SOLVAY PROCESS DIVISION
Allied Chemical & Dye Corporation
61 Broadway, New York 6, N. Y.

Gentlemen:

Please send me AT NO COST OR OBLIGATION your FREE BOOKLET "Calcium Chloride in Refrigeration."

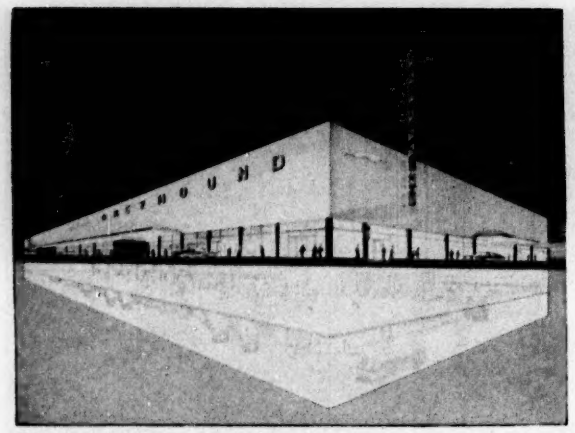
Name_____

Position_____

Company_____

Address_____

54-8



Chicago Greyhound Terminal, in cut-away view, showing how the below-street levels are utilized for bus station operations. The loading concourse surrounds a glass-enclosed passenger island. The two upper floors are public parking space for 500 automobiles.

A view of the air conditioned waiting room of the year-old Chicago Greyhound Terminal. Photo was taken from street level arcade. Bus concourse is below waiting room level. Two 300-ton Carrier centrifugal water chilling units serve the air conditioning system.

New Chicago Bus Station Completes First Air Conditioned Year

MORE than two million travelers used the new air conditioned Chicago Greyhound terminal in its first year of operation. As many as 500 buses a day used this unique lower level terminus. This structure, opened in March 1953, represents a 10 million dollar investment.

In Chicago's loop, the Chicago Greyhound Terminal occupies an area of 66,000 square feet and is a five-level structure that contains, in addition to the most modern bus station facilities, many stores, shops and restaurants, as well as parking space for 500 automobiles. Three floors are above and two below the street level. Two top floors are for auto parking; the street terminal arcade entrances are surrounded by shops and restaurants. The waiting room, ticket offices and other passenger facilities are located on the first level below the street (see illustration); and, on the second lower level, the bus loading concourse.

This loading concourse surrounds a glass enclosed passenger island shown in the picture. Boarding stations, in saw-tooth pattern, provide room for 30 buses at a time. The buses enter the concourse through a 225-foot long private two-lane tunnel. An electric heating system embedded in the concrete melts all ice and snow on the approaches. Three moving stairways run from the bus concourse to the wating room above. The center of the waiting room is two stories in height. Three more stainless steel electric stairways service the waiting room to the street level.

Air Conditioned Entirely

The entire waiting room area, the arcades and all stores are air conditioned with a Carrier plant of 610 ton capacity. Equipment for ventilation and air conditioning has been installed in space provided on the roof. The ventilation system for the open section of the concourse where buses park, has a capacity of 180,000 cfm, which creates a continuous five-mile-an-hour breeze through the tunnel. Three exhaust fans with local and remote control from engine room on 3rd floor, accomplish this air movement.

The passenger concourse, the island on the bus level, has conditioned air supplied from the 3rd floor engine room and roof intakes, by two 20,000 cfm units. Heating, chilled water, and reheat coils are contained in the units which are semi-automatically controlled. Air is exhausted through door grilles and vents into the bus concourse. No air from any levels below the street may be recirculated. The city code requires 100 percent fresh air for ventilated areas below grade. Similar units of smaller capacity supply the shops and restaurants. Some of the systems employ amounts of re-recirculated air up to 75 percent as allowed by code.

Hotel Supplies Steam

Steam for heat and reheat coils is 7psig. Source is the boiler plant of the Hotel Sherman across Clark Street from the Terminal. It is supplied at 50 to 55 lbs. Two Carrier, Carrene-2, 305-ton Centrifugal units operating on 35 F suction, 101 F condensing temperature, and 85 F tower water, chill 732 gpm cooling system water from 55 to 45 F. The chiller is 2-pass with a 37.5 ft pressure drop.

The centrifugal compressors are each driven by 300 hp, Louis Allis, 1800 rpm induction motors. Terry gears are provided to attain the 6000 rpm at the compressors. Each entire chilling unit consisting of compressors, condensers, chillers, motor, gears and miscellaneous accessories, is mounted on a base which floats on machinery isolation corkboard to prevent noise and vibration from traveling through the building structure.

Condensers as provided to the job were intended for use with city water, dumping to the sewer. They were 400 gpm, 4-pass, with 23.5 ft. drop

(Continued on page 53)

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

Defrosting Low Temperature Evaporators

IT IS the responsibility of all engineers to use as economically as possible, the potential energies available. The degree to which this responsibility is accepted by an individual engineer, any group of engineers or any manufacturer is a measure of the service rendered — the only true measure of success.

In considering the problem of defrosting low temperature forced convection evaporators, we find what is in a sense a parodox. We have an insulated enclosure designed to prevent the infiltration of heat. And yet, energy, in the form of heat, must be introduced in order to rapidly defrost the evaporator. Obviously this should be accomplished with as little induced energy (or heat) as possible. The use of water, ordinary tap water, meets this requirement.

Water defrost is simply a method of introducing a liquid substance with a high thermal capacity, distributing it evenly over the entire coil, and then draining the water rapidly. It is available for either floor or ceiling type units. In the floor type unit water is sprayed over the finned coil by nozzles located in the space above the coil. The nozzles are arranged on a header which is pitched so the water drains away from the nozzles at the end of the defrosting cycle (se Fig. 1).

Ceiling type water defrost units are equipped with a perforated pan located above the coil (see Fig. 2). The holes are arranged in rows above the center of the tubes. Water is also applied to the return bends and side panels by a suitable distributing tube. In order to assure a proper force of spray through the perforated pan, a "head" or water level of about one inch inside of the spray pan is necessary. A sight glass is built into these pans so water level can be observed.

Defrosting Principles

In any defrosting process, heat must be applied to the coil at a rate sufficient to: 1) offset the leakage to the surrounding air; 2) melt the accumulated frost; and, 3) raise the temperature of the coil to 32 F, plus.

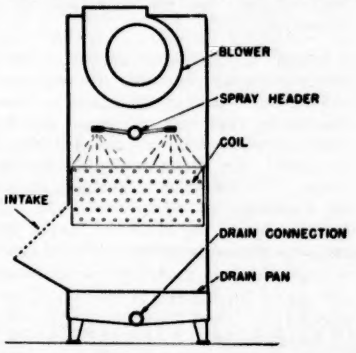


Fig. 1 — Arrangement of water defrost spray headers and drain facilities in the floor mounted forced air evaporator unit.

There is a distinct advantage in accomplishing the operation in this sequence. With water defrost, Nos. 1 and 2 occur almost simultaneously; and because the coil, which represents the largest single mass, is the last to be warmed to only 32 F. Water spraying over the coil maintains a physical contact with all of the frost until completely melted and drained away. There is no melting of the ice from the inside causing chunks to fall away from the coil and then depending on the heated pan to complete the melting while the coil surface continues to raise in temperature.

Defrosting by the use of water is rapid. Because of the large quantities of water than can be brought into direct contact with all of the frosted surface at one time, and because of the large thermal capacity of water, complete defrosting of a rather heavily frosted coil can be accomplished in about four minutes. This rapid defrosting localizes the heat at the coil and means less temperature rise of box walls and product and less recovery needed after operation is resumed.

Correct Installation

Water refrost is economically installed, and economically used (less installed hp or electricity). Assuming a water temperature change of only 28 F. (60 F entering, 32 leaving), each gpm of water supplies heat equal to four kw of electricity. Since 10 gpm is commonly used on medium sized units, it is evident that considerable electrical energy would be needed to introduce the equivalent amount of heat (enough electricity to run a 40 hp motor). Water — ordinary tap water — does the job.

As with all equipment, there is a correct way to make the installation, and any deviation from correct procedure invites hazard. However, the correct method of installing a

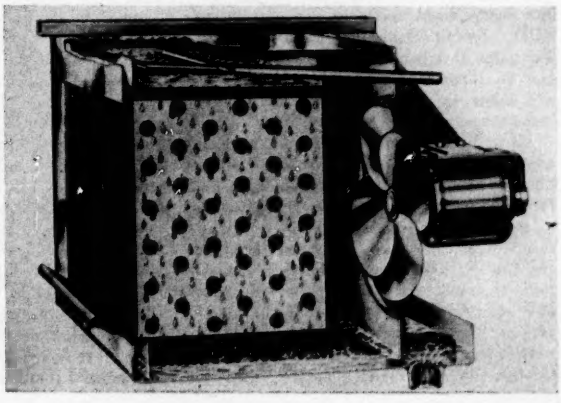


Fig. 2 — Illustration of ceiling hung unit utilizing water defrost. Note perforated distributing pan with its water "head", distributing tubes and drain arrangements.

Synopsis of paper presented before San Francisco Chapter, NAPRE, on Feb. 10, 1954, by Harold H. Halls, "Recold" representative, Los Angeles.

EXECUTIVE OFFICE, NAPRE
433 N. Waller Ave.,
Chicago 44, Ill.
OFFICERS
President, L. J. Vivien,
New Orleans 22.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, an educational association.

water defrost system is extremely simple. An ample supply of water and a drain with a minimum pitch of one-half inch per foot is needed. The drain must always be trapped outside of the refrigerated area in order to keep warm and moisture laden air from entering from this source.

Such a passage of moisture laden air could deposit its moisture in the form of frost at the drain opening and cause trouble at the start of the next water cycle. A properly trapped drain is proof against such an occurrence. Where more than one enclosure is hooked to a common drain, the drains should be trapped before they become common. This will prevent movement of air from one enclosure to the other with the possibility of carrying moisture to the drain outlet of the colder coil.

Automatic Operation

Automatic operation is extremely practical and inexpensive. There is no need for pressure regulating valves or other devices to protect the compressor or other component parts of the system. The refrigerant lines are installed exactly as for normal temperature jobs; sized only according to the liquid required for the job and for the returning suction vapors.

News Notes and Chapter Activities

New Orleans

LEO J. VIVIEN

JOUETT Menefee Speed, called JM by most of his friends, died Friday, June 25, 1954 at Jacksonville, Florida. He was brought to New Orleans for burial. Mr. Speed was 74 years old. He moved to Jacksonville with his son, R. P. Speed, in 1952 after residing in New Orleans since 1923. While in New Orleans, Mr. Speed was branch manager, Mundet Cork Company.

JM was very active in La. Chapter No. 2. It was because of his unselfish devotion to the work of advancing the chapter's membership and programs that he was declared a chapter Honorary Member. For the past few years failing health hampered his activities, but his work and spirit lingers on.

Joseph C. Molaison, native of New Orleans, was 43 years old. He was chief electrician, Godchaux Clothing Co., New Orleans for many years; married and the father of three children. He died March 20, 1954. Mr. Molaison joined the La. chapter, NAPRE, some years ago to further his knowledge of refrigeration, and was quite active in the chapter. During the past two years he resided in Slidell, Louisiana. He was proficient in his trade and shared his knowledge with his fellowmen.

Chicago

JOHN M. FORTI

AT THE meeting on June 8, George Anderson, Association of American Railroads, lectured on the Mollier diagram as part of the preliminary refrigeration instruction. The main speaker of the evening was National Secretary, J. Richard Kelahan. Dick's topic was "Insulation — Types and Uses in the Refrigeration Field."

Members attending this meeting learned that no insulation installation is effective for very long unless a good and positive vapor barrier is used. This vapor barrier will keep moisture from penetrating into the insulation thereby losing its insulating value. Several insulations are on the market today that contain a partial vapor barrier in themselves. In others, provisions are made in the installation to remove transient vapor.

An important point brought out by Kelahan was to review the selling points claimed by manufacturers of insulation before purchasing it. A good grade of insulation should qualify on better than three-fourths of desired qualities listed in the Guy R. King Course, *Basic Refrigeration*. Samples and literature on all types of insulation were available for the members in attendance. Three new members were admitted to the Chicago Chapter: George Anderson, AAR; Carl S. Carlson and Robert M. Forti, both of Westerlin & Campbell Co.

Central Cold Storage was the site of the meeting on June 22, when Bert C. McKenna, chapter president for the past two years, turned over the reins to Lloyd Beard, Kraft Foods Company. It was a hot buffet dinner meeting, combined with initiation of over 20-odd new members and installation of new officers.

The preliminary refrigeration meeting was conducted by George Anderson. Then the buffet was served by Bert McKenna and members of the Central Cold Storage engineering force, who had spent the better part of the afternoon preparing the repast. Following the dinner, which was augmented by plenty of a product for which St. Louis is known, John Neff, a national Past President and Honorary Member, initiated the new members of the Chicago chapter.

President McKenna then asked the National Secretary to take charge of installation of the new officers. Each officer was instructed in his duties and charged with the responsibility of his particular office before the entire assembly. Following this installation the new President, Lloyd Beard, spoke a few words of thanks and announced that the first fall meeting would be a social affair, at which the ladies would be present, and would honor retiring president, Bert McKenna, who is National Board Chairman, NAPRE.

The following engineers were installed as new officers of Chicago chapter: Lloyd Beard, President, Krafts Food Co.; Art O. Clementson, 1st Vice-president, Julian Engineering Co.; Nick Downes, 2nd Vice-president, Illinois Bell Telephone Co.; William L. Tiffin, Financial Secretary, Ideal Electric; William J. O'Reilly, Recording Secretary, Central Cold Storage Co., Dearborn Street; Hubert Rancour, Treasurer, Central Cold Storage, Blue Island; and Benjamin R. Burns, Sergeant-at-arms, Main Post Office, Chicago. Bert McKenna, Earl J. McMichaels and Eugene B. Kelly were elected Directors. A. R. Carlson, John Neff and J. R. Watson were elected Advisers. Gene Rytlewski, Dick Zach and George Anderson were retained as Instructors.

Coastal Bend Chapter

VERNON KUMMEL

THE Texas Coastal Bend Chapter, NAPRE, became a reality on June 29 with the presentation of a charter by A. R. Carlson, national Past President. The presentation was made at a dinner meeting at Corpus Christi Engineer's Club, with charter members and their ladies present.

National director, R. A. O'Neill, who was instrumental in the formation of the chapter, was installed as the chapter's first president. The other officers are Vice-president, Dan Miller, Secretary-Treasurer, Vernon M. Kummel, Sgt.-at-arms, Herbert Snyder; Directors, Oscar Talley, A. D. Campbell and Miss Loraine Fraser. This chapter thought it would be among the first to have a lady member, but was informed by National Headquarters that Miss Fraser is the third woman to hold an associate membership in NAPRE.

This chapter started with 25 charter members, of which only two had previously been members of NAPRE. These two were national Director O'Neill and Henry Black. Mr. Carlson, vice-president of Southeastern Public Service Company, initiated the new members, installed the charter and the first officers noted above. He got the chapter well under way on its first membership drive by offering, in the name of his company, a $25.00 government savings bond for the present member who obtains the most new members by December 1, 1954. Following Mr. Carlson's remarks, Director O'Neill presented the members with their certificates and membership cards.

Dallas

GEO. F. STEWART

ON MAY 3, a field trip to Dallas Power & Light plant was made. An NAPRE member with the firm, Warren Cunningham, was in charge of the tour.

Our regular meeting, May 17, was held at Alfords Refrigerated Warehouse. William E. Weaver, service manager, Mathews Engineering Co., conducted the refrigeration lesson. Bro. Weaver, having years of experience in the field, covered some of his experiences which made the lesson more interesting.

Members-at-Large

LEROY ETZEL

THIS column will welcome any news items and anecdotes from NAPRE membership in this classification. The chapters have an opportunity to pass on informative and educational matters through their reports, and at times, include stories of general interest about their members. Why shouldn't the Members-at-large take advantage of this opportunity similarly?

Let's continue this month our random jaunts around the country visiting our brothers that are unaffiliated with the chapters. If you are in the mood to visit in Northern Illinois, we could call on L. A. Davis, vice-president of Peoria Service Co., a member now of many years standing; Carl Danz, is another member-at-large with the Cedar Point Co-op Cold Storage at Cedar Point, Illinois. Up in Minnesota, we have members Telbert Cutting and B. E. Smith at Winnebago and Fairmont, respectively; both are chief engineers in their respective plants. Brother Smith is also a member of Professor Venemann's educational committee.

Back in Indiana we have Blanchard L. Sprunger with Continental Freezers, who makes his home in Lafayette, and Anthony E. Wochna with Indiana Terminal and Refrigerating Co. at Indianapolis. Anthony is very active with Frank Behning in forming an Indianapolis chapter. We may hear this chapter announced as one of our newest at the convention during November. Another Indiana member is Louis Beach, who has done his best at Evansville with John Dabbs, our national membership chairman, in an effort to get a chapter established there. Louis is chief engineer of the Evansville Ice and Storage.

Way up in Alaska, *we* have another member, Allen A. Lowrance, chief engineer of the Sitka Cold Storage. Perhaps sometime we can persuade Allen to give us a little story on the problems that confront the refrigerating engineer up there in what we normally consider as nature's ice-box. Our brother member, J. Schafer, is manager of the Swift & Co. at San Juan, Puerto Rico. I imagine that brother Schafer can give us some interesting discourses on problems that confront the meat packer in the Islands. We also have another member in England, Thomas Ewan Douglas, who is on the technical sales staff of William Douglas & Sons in London.

Walter E. Bernd Starts Consulting Business

One of our very good active members in this classification, who incidentally is a past national President, is Walter E. Bernd. Walter writes recently that he is now in the consulting business in Washington, D.C. Walter, who has been a supervising engineer for many years, has hung his shingle out as refrigerating consultant. He makes his office at 2727 Chesapeake St., N.W., Washington, D.C.

Brother Bernd was formerly vice-president and general manager of Terminal Refrigerating & Warehousing Company in Washington. His firm was recently sold to Merchants Terminal Corporation of Baltimore. One of Walter's first clients in his new business, was the Hoffberger family, owners of the Merchants Terminal enterprises.

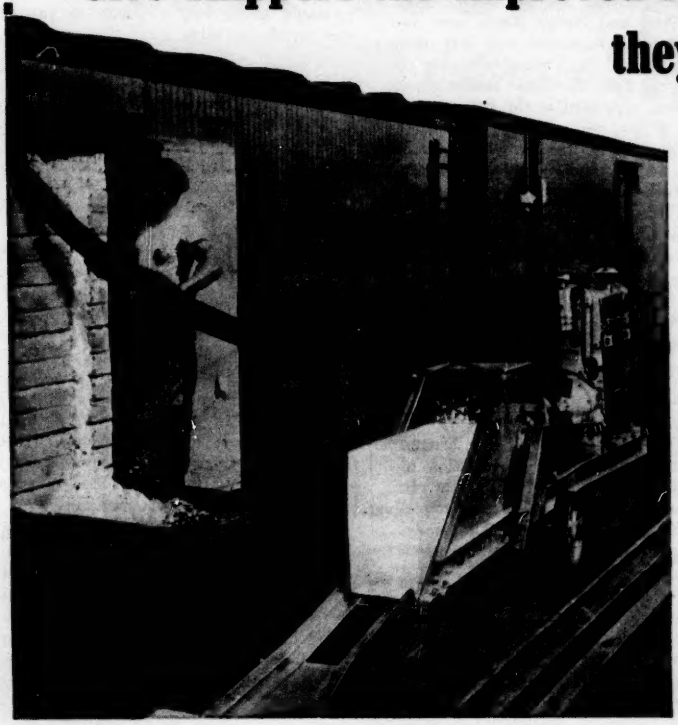
Memphis

CHAS. A. CONLEY

ON JUNE 2, through the cooperation of Barney O'Kane, local manager, and John S. Mitchell, Crane Co. there was shown a picture just released by Crane in color and sound, titled, "Choosing The Right Valve". The story was a discussion between owner, engineer and salesman, as to the correct type and kind of valves to use on a big new job that was just starting to build. This picture is one of the best. It gave a lot of valuable information on the subject.

Another picture was shown on die and tool making; showing how dies were made for forming various shapes such as auto and refrigerator bodies, how the precision and standard tools were made, how so many thousand parts can be made in a day by pressing out the forms with dies, and how the apprentices were trained to become expert die and tool makers. Refreshments followed the shows. Lewis T. Newman, assistant engineer, International Harvester Co., and James L. Bray, sales engineer for Crane Co., Memphis, were elected to membership.

Give shippers the improved refrigeration service they require today



THERE'S no better way to top-ice railroad cars and trucks containing perishable products than with a Link-Belt Ice Crusher-Slinger. It's fast, effective, easy, economical. Moreover, it assures shippers of fruits, vegetables, seafoods and dairy products that their merchandise will arrive in tip-top condition—demand top prices.

With only a small investment, you can sell better ice service . . . boost your business . . . increase your profits. Choice of stationary or portable—electric or gasoline engine powered machines. Capacities from 15 to 60 tons per hour. Your nearest Link-Belt district office can supply complete information. Or write for new Book 2382.

LINK-BELT

13,438 ICE CRUSHER-SLINGERS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

Los Angeles

FRED HERR

LOS ANGELES chapter closed out its first half of the year with a rousing Old Timers' Night at the Terminal Club, June 16. In an atmosphere of good cheer, the last meeting prior to the summer vacation honored the older members, many of whom have been staunch NAPRE supporters since the early 1920's. President Frank Eccleston intruded on the pleasantries of the evening with only one item of business when he presented for approval the application for membership of Elmer Wagner, chief engineer, Los Angeles Biltmore Hotel.

The programme: a social hour with canapes and hors d'oeuvres served with appropriate collations to the tune of piano music and community singing at 6 o'clock; a Swiss steak dinner at 7 o'clock; and the introduction of old time members at 8 o'clock. There were some two dozen door prizes, ranging from an electric razor (won by Ed Nelson) to cases of tuna and lubricating oil, which had been donated for the occasion by various firms and individuals. A floor show, presented under the direction of entertainment committee chairman Nelson, was the final item on the evening's program. Nelson and George F. O'Connor, Pacific Fruit Express Co., divided the duties of "MC".

The introduction of the various old time members elicited a wave of reminiscences that spanned the years between 1954 and 1922, when the chapter had its inception as California Chapter No. 2. Special honors were accorded to Flavil C. Register, on whom master-of-ceremonies Ed. L. Nelson conferred the title "our peripatetic member", by virtue of the fact that Register has spent more than ten years on trips from Los Angeles to such out-of-the-way spots as Guam, Eneiwetok and Bikini Islands in the South Pacific. He was called on for a short talk and explained some of the problems of air conditioning and refrigeration in the islands, where he has served as supervisor of air conditioning for Holmes & Narver, Inc., Los Angeles.

With him at the NAPRE meeting was Walter Brudvik who served as Register's assistant in the islands. Brudvik confided to INDUSTRIAL REFRIGERATION that he has given up his south seas wonderings and is now established in business in Palm Springs, Calif., under the firm name of Brudvik Refrigeration Service.

Rio Grande Valley

ARMIN F. DONEIS

DURING the question period on June 22, the need for thorough and systematic maintenance of ammonia compressor discharge and suction valves was discussed at length, and several helpful hints on testing and valve-grinding procedure were exchanged.

Dan Chapman presented an interesting talk, with demonstrations, on relative humidity, sling-psychrometers, hygrometers and psychrometric charts. Dan explained how the volume of water vapor absorbed by the air varies with the temperature and availability of water-vapor, and how the relative saturation of the air determines evaporation from moist surfaces, and affects personal comfort. He explained thoroughly the terms *saturation* and *dew point*, and stated that roughly the optimum relative humidity for comfort at 70 F. is considered between 40 and 50 percent.

He explained the need for dehumidifying in summer and reverse procedure during the winter heating season when indoor air tends to be too dry. Dan indicated that RH together with barometric pressure changes and other measurements and observations, enable the weatherman to predict weather conditions He demonstrated the use of a psychrometer, and emphasized its usefulness in determining the efficient operation of induced draft cooling towers.

John Muller then related Dan's remarks to the direct connection between RH and cooling tower operation. He emphasized that any time the outgoing air from the tower has an RH of 100 percent, the tower was operating efficiently, and nothing can be done to increase its cooling effect. Also stressed was the possibility of wasting power by pumping too much water over the cooling tower under certain conditions, especially when the incoming air to the tower has an unusually high RH. Instances were given where more cooling effect and savings in power consumption were affected by pumping less water over the tower during periods of high RH.

The secretary reported a communication from national headquarters concerning formation of a new Coastal Bend Chapter in the Corpus Christi region, stating that R. A. O'Neil and Henry Black were instrumental in its formation and that their memberships had been transferred out of our Chapter into the new one. Much pleasure was expressed at the news of the founding of the new chapter, but regret was also evident at the loss of these two faithful members from our own chapter.

John Muller reported more fully on the Corpus Christi chapter, stating that a cordial invitation had been extended to members of Valley chapter to visit any time we are up that way, since they will hold meetings on alternate Tuesdays to our chapter.

San Francisco

LEWIS BROOKS

AT OUR April meeting, Ned Chestnut put on an interesting presentation of the Barber-Coleman system of controls. On demonstration was a cut-away model of a modulating type motor. The model showed most clearly the exact workings of this type of device.

Two new members were admitted into the chapter. They are Frank R. Wallingford, Golden State Co., Southern Division Engineer, Whittier, Calif., and Howard W. Heimbruch, Golden State Co., Pasadena, Calif. (Los Angeles take note: Calif. No. 1 extended its jurisdiction and stole two new members under your nose, while you fellows were looking in such far-off places as New Zealand and Georgia.)

"High-Jinks", Calif. No. 1's favorite "Springtime Coming Out Party" was held in May. The turnout was excellent and reminiscent of earlier days. June came and went with a field trip to the air conditioning plant at the local NBC studios. The chapter will recess regular meetings for the months of July and August. Tentative plans were made for a Dinner Dance September 8, "Ladies Nite". Brother Herzog in behalf of NAPE invited NAPRE to attend the annual NAPE picnic August 6.

Milwaukee

L. J. ANDERSON

THIS revived chapter at Milwaukee has continued to hold one regular membership meeting and an executive committee meeting through May, June and July. We are rather anxious to have our chapter functioning with a capable group of engineers in charge by the time the other chapters reconvene this fall. Milwaukee is out to be among the best.

Temporary officers elected are as follows: Al Rohloff, President; Pat Kelly, 1st Vice-president; Claude Horton, 2nd Vice-president; L. J. Anderson, Secretary, Jack Schmidt, Treasurer and Bud Tondreau, Sgt.-at-arms.

In May, our meeting was in the form of a field trip to the Blatz Brewing Company. We got together in the cafeteria and held a business meeting in competition with the Braves vs. Cincinnati ball game. When we got back to the cafeteria from the plant tour, the Braves had squeaked by the Red Legs. We celebrated with a he-man's lunch and a bottle or two of that wonderful brew.

In June, the meeting was held at the Milwaukee School of Engineering. Quite an array of speakers faced us that evening. They were Fred Koehler, Test Engineer, Vilter Co.; Joseph Long, Application Engineer, Vilter Co., and Erwin Koth, Sales Engineer, York-Wagner Corp. They covered service and maintenance problems that were interesting and unusual. Perhaps the best way of explaining this is to say that the topics covered the age-old argument as to which is the better position for an accumulator with a flooded evaporator, vertical or horizontal. The service problem of an evaporator freezing up in an air conditioning system was discussed. Relative merits and efficiencies of clearance pockets in compressors at various load conditions were fought out. Even the types of fittings came in for discussion, whether two or four bolt flanges were safest and best suited for ammonia.

Revival of the old Wisconsin Chapter, which will now be known as Milwaukee, was undertaken by C. Ward Stoner, one of Professor H. G. Venemann's first students at Purdue. Brother Stoner is now Vice-President and Chief Engineer for the Ben Hur Manufacturing Company, Milwaukee, and a member of Milwaukee section, ASRE.

Data on Finned Type Evaporative Surface

QUESTION NO. 1006: Where can I find a table or data on the proper lengths of finned type evaporative surface to be used with a single expansion valve? I can see where such cumulative data might be quite involved, since it would vary with the pipe diameter, the fin surface, the T.D., and possibly the rating of the expansion valve, gas velocity, etc. Anyway manufacturers of certain coils I have been using with F-12 have not supplied any data.—G.V.B., Chicago.

ANSWER: We have written to several coil manufacturers for an answer to this question, but up-to-date none has given us either table or data. We were informed by our good friend D. D. Wile, Los Angeles, that a paper bearing on this subject was given at the ASRE meeting at Seattle, Washington, July 10-14.

G.V.B. who asked the question seems to be aware of the many factors involved in developing a table such as he wants. Perhaps it is because of the complexity of the problem that no manufacturer cares to "stick his neck out" and publish one for general use.

Perhaps the paper by W. L. Holladay on "Determining Pressure Drop in 'Freon' Systems" given at the Wednesday, July 14, session will aid in simplifying the problems. This paper contains new charts and tabulations for determining pressure drop for "Freon 12" and "22" through evaporator circuit, suction, discharge and liquid lines.—H.G.V.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Both questions and answers should be addressed to Prof. H. G. Venemann, 269 Littleton St., West Lafayette, Ind.

Bearing Alignment

QUESTION NO. 1007: At Rio Grand Valley Chapter, Instructor Muller brought up for discussion the problem of bearing alignment on a twin-cylinder vertical enclosed ammonia compressor, in which the three main bearings were replaced with new ones at the time a new crankshaft was installed. The original crankshaft had broken. Tests showed that after due care was exercised in assembly, there was considerable distortion indicated between crank-throws. Various methods of procedure were discussed, to remedy this strain and distortion, including the use of lapping compound, scraping-in the one high bearing or line-boring the high bearing, in order to get a zero reading on the alignment gauge at all points of crank travel. The bearing inserts were factory-made, and there was little likelihood that any distortion of the compressor base has taken place, yet there was a definite misalignment. Since all three bearings are integral with the base no easy adjustment is possible by shifting one or the other bearing. Any suggestion from other NAPRE'rs?—A.F.D.

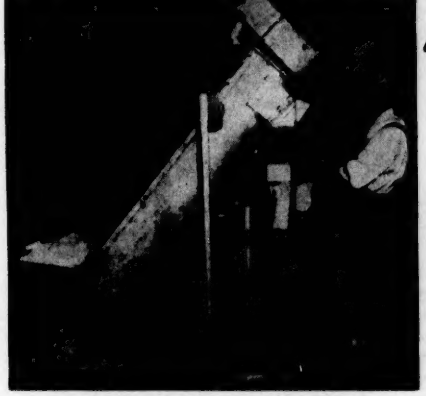
ANSWER No. 1: R. L. Beach, assistant general service manager, York Corp., furnishes us with the following instructions on checking shaft alignment, with an added comment: "I suggest from personal experience, that the points concerning the locating and doweling of the bearing head and the possible distortion of the base by excessive tightening of the foundation bolts be noted in particular".

Checking Shaft Alignment

In checking shaft alignment of enclosed compressors the following is suggested:

(a) Pump out the compressor and remove the bearing head opposite the stuffing box, also the crank case cover, and disconnect the connecting rods from the crank pins.

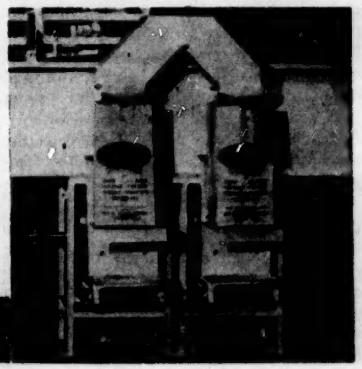
Controlled Uniformity ... Means
LOW-COST PACKAGING



Automatic WEIGHER-BAGGER

FAST — ECONOMICAL — ACCURATE

SLASH LABOR COSTS . . . sell more ice, no overloading! Customer gets only what he pays for. Bags weigh the same whether filled with snow, medium or large sized ice, any crushed ice, cubed ice or tube ice. Can be made to fill any size bag: 7½ to 100 lbs. Adaptable to fit your present equipment . . . crushers, sizers, Vogt Tube Ice Machine . . . engineered for you. You get the same accuracy with portable unit or permanent installation. This automatic machine is designed so it can be operated by one man, two, or three, depending on your bag requirements.



COMPLETE SUPPLIERS TO THE ICE INDUSTRY

WRITE, WIRE OR PHONE Fort Worth, FOrtune 8474 for full information.

(b) Remove the outboard bearing cap and place a shim between it and the shaft (see Fig. 1).

(c) Pull the shaft away from the stuffing box end bearing far enough to insert feelers around the shaft. With the shaft central in the stuffing box and resting on the bottom surface of the bearing, there should be .004" to .006" clearance, shaft to upper surface of the bearing.

(d) Slide the bearing head over the shaft and check with feelers as it enters the recess in the compressor. The clearance should be approximately equal all around.

(e) In assembling these compressors at the factory it is sometimes necessary to dowel the compressor bearing head to the compressor after alignment, to insure proper alignment after re-assembly. Watch for these dowels, and be sure to set them back in place, if used.

Hot Bearings

If an enclosed compressor in operation shows excess or serious heating in the stuffing box or main bearing, this may be due to misalignment of bearings caused by improper setting and grouting.

Check the temperature of the main bearing or stuffing box, at the same time loosening the foundation bolt nuts, two at a time, starting with those nearest the flywheel. If this does not result in a decrease in temperature, tighten these two nuts and loosen those at the opposite end.

Next, try the nuts on the center bolts. If these three steps do not result in a decrease in the bearing temperature, then the packing should be removed from the stuffing box and the alignment of the shaft checked with a round rod as previously explained, at the same time loosening the foundation bolt nuts again, two at a time, starting with those nearest the flywheel.

The clearance between the stuffing box and the shaft should remain uniform and show no change during each of these three steps. If not, there is evidence that unusual strain has been placed on the crankcase because of improper setting and grouting, and the machine should be re-grouted.

Replacing End Bearing Head

When replacing an end bearing head for an enclosed compressor (6" to 10") which has been supplied from York without two dowel pins to center the head on the housing and keep the three bearings aligned, remove the outboard bearing cap and top bearing, and insert a liner .005" thick between the shaft and the inside of the top bearing. Then reassemble the bearing cap on the outboard bearing, bolt it down, and install the bearing head in the proper position and tighten the bolts evenly. Next, the liner may be removed from the outboard bearing, and the rest of the compressor reassembled.

If this procedure is not closely followed, the shaft can become misaligned, because the weight of the pistons and connecting rods will force the shaft down to such an extent that the shaft will bear up against the top of the outboard bearing and down on the bottom of the main bearing. This automatically causes the shaft to be .003" or .004" out of alignment. Placing a liner in the top of the outboard bearing will force the shaft down in the bearing and bring it into alignment.

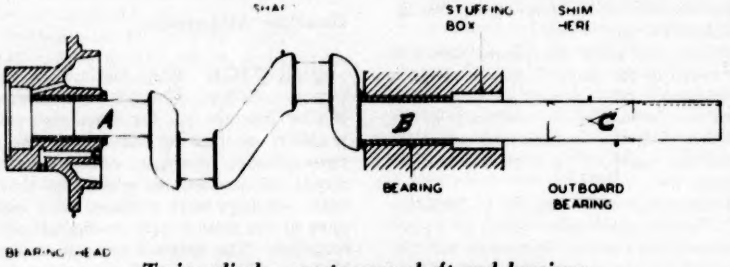
Placing the shim in the outboard bearing is not necessary if the back head is doweled, as the dowel pins automatically centers the three bearings.

Where enclosed compressors do not have two dowel pins in the bearing head opposite to the stuffing box, this indicates that the housing and the bearing head were centered and the bearings in proper alignment when the parts were assembled at the factory, and no adjustments were necessary.

Where an enclosed compressor has two dowel pins in the bearing head opposite the stuffing box, this indicates that individual treatment was required to properly center the bearing.

Depending on the design, the cast iron base can be twisted or bent out of alignment when the anchor bolts are pulled down, or if the wedges above the foundation were improperly placed. If the compressor frame is lifted off the concrete, this might be corrected. It is even conceivable that the outboard bearing could be raised slightly by careful wedging, if it were only a trifle low. If this bearing is on a pedestal of some height the shaft might be out of alignment horizontally, because the base frame is twisted. Replacement bearing sleeves are often die-cast when manufactured, the molds being so near to finished size that little or no machining is required. For this reason it might be difficult to get an undersized sleeve except on a special order.

The same remarks would largely apply if one of the two main bearings proves out



Twin-cylinder compressor shaft and bearings

ANSWER No. 2: Terry Mitchell, Frick Co., gives the following suggestions: (Note: A refers to cover plate bearing; B to packing gland bearing, and C to outer bearing). It seems probable that the original shaft broke because the bearings were out of alignment.

To correct the difficulty, the shaft will have to be removed again. By the use of tightly stretched piano wire and pin gauges, a check should then be made to see whether the two bearings immediately below the cylinders are in right-angular alignment with the cylinder bores. If so, the outboard bearing could probably be scraped by hand to carry the weight of the drive, provided it was high. If this bearing is low, an undersized sleeve might be ordered for it, bored eccentrically enough to correct the mis-alignment. Or, the shaft could be lined up carefully and babbitt poured in the bearing that is low, the shaft being removed before the babbitt could shrink on it.

If bearings "B" and "C" are in alignment, the difficulty at "A" can be corrected by re-centering the cover plate in which the bad bearing is located. This can be done in any of several ways. The hole can be bored and fitted with an eccentric bushing into which the regular bearing sleeve is then fitted. Or, the shoulder which centers the bearing housing in the compressor frame can be turned down at the counter-bore and a guide ring be shrunk around it.

If bearings "A" and "C" are in alignment, then the hole at bearing "B" can be rebored or fitted with an eccentrically turned bearing to compensate for the difficulty. If all three bearings seem to be out of alignment, then a reboring of all the bearing openings will be necessary.

of line. In any case, it would be well to consult with the manufacturer of the compressor.

Vibrating Discharge Piping

QUESTION NO. 1008: Problems of vibrating discharge piping from twin cylinder compressors raised the question as to whether a surge chamber in conjunction with re-arrangement of piping close to the compressor would be a feasible solution. It appeared that the alternate pulsations from the two adjacent cylinders could be smoothed out some in the surge tank or eliminated. But the size of surge tank required for the job remained a question without an easy answer.—A.F.D., Rio Grande Valley.

ANSWER: I consulted with Bill Richards, an enthusiastic member of Chicago chapter, and sales engineer for H. A. Phillips & Co., makers of surge tanks, etc. His reply is quite enlightening:

"In answer to the question concerning line vibration, I asked "Mike" Goddard, Carrier Corp., about the use of mufflers we made for them. He reports that the discharge line muffler merely reduces gas pulsations, which reduces noise. He says that line vibrations come from two sources, gas velocity and mechanical transmission from the compressor. Eliminating vibration requires breaking up the sympathetic elements by judicious placing of hangers and braces. This gets down to 'cut and try' methods."

I asked one of our professors who instructs on vibration in our Mechanical Engineering Dept., expecting to get a long dissertation of "high-faluting" terms, but instead he said "If the line vibrates, hog-tie it".—H.G.V.

Damaged Castings

QUESTION NO. 1009: At Rio Grande Valley the repair of damaged castings resulting from misalignment came up for discussion, and various cold-weld processes like Metallock were referred to briefly as means of mending racked castings. The available information at the moment was scant, and any further data that can be given on the proper repair of heavy castings and compressor frames will be welcome.—A.F.D.

ANSWER: Metallock is a patented process approved by insurance companies for repairing broken cast iron or steel parts. One firm known as the Metallock Casting Repair Service, 27-05 43rd Avenue, Long Island City 1, N. Y., has agencies distributed throughout the country. Their literature describes and illustrates repairs which have been made on compressor frames, steam turbine housings, large gears, fly wheels, crank-shafts, steel forgings, and many other kinds of machinery.

Metallock is a method of making cold repairs on cracked or broken machine parts or pressure vessels of cast or forged metals. Metallocks are keys made of special alloys. Size and number used vary with conditions and amount of strength to be restored to fractured metal. Slots are cut transverse to fracture and the locks are inlaid by cold working into parent metal. The alloy used in Metallock repairs is of the 36 percent nickel steel variety, selected because of its favorable cold working properties. I think that repairs of this kind must be done by authorized agencies.

Welding Compressor Frames

It has been rather difficult to weld cracks in bell-shaped compressor frames without heating the frame to a rather high temperature. Often attempts to weld cracks around the cover plates by oxy-accetylene gas without preheat, produced such high temperatures at the point of application that severe strains were set up in the casting causing cracks elsewhere. However, the Eutectic Welding Alloys Corporation, 172nd Street & Northern Boulevard, Flushing, New York, has a process by which this can be done without heating the entire mass. It is a process of arc-welding, using special low temperature alloy rods. I suggest that you write the company for instructions as to how to use their materials.—H.G.V.

Metal for Handling Calcium Chloride Brine

QUESTION NO. 1010: What metal is best suited to handle calcium chloride brine; I refer to duplex steam pump valves. We are overhauling our one steamer and find most of the suction and discharge valves jammed and stuck shut — but good. This is a new one on me. These valves, seats, studs and nuts are all iron. Is there a better metal for this job? How does stainless steel stand up on this job, also bronze or brass?—R.G.S., Buffalo.

ANSWER: On salt-water pumps having cast-iron bodies and parts in contact with salt water, care should be taken to guard against corrosion. These parts should be scaled, and wire brushed as circumstances require, and the cleaned surfaces coated, if time permits drying, with anti-corrosion paint or enamel. The use of zincs in the water line to the pump will minimize corrosion.

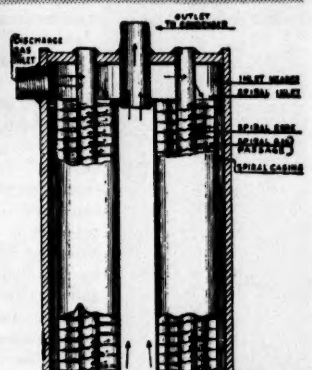
When laying a pump up, some engineers fill the pump with oils after draining off all salt solution. Of course, the packing glands are tightened down, and inlet and discharge valves tightly closed. Oil may be drained out and pump flushed before placing back in operation.

Investigate water end first. If a pump works badly and is in need of repair, do not touch the steam end until a thorough investigation shows that the trouble is not at the water end. Most pump troubles are due to fouled water cylinder, worn valves, or other faults in the water pipe connections outside the pump. In pumps that have the valve seat screwed into the pump diaphragm, they should always be screwed in with white lead or other anti-seize compound. Otherwise it will be almost impossible to get them out.

If you haven't been able to effectively free the valves in your duplex by this time, and intend to buy a new one, I would suggest you obtain one with a centrifugally cast bronze lining, bronze pistons, and bronze or monel rods. I would suggest

"King Zeero"

OIL SEPARATOR



STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE

Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.

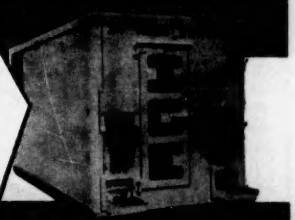
Made in 12 sizes, ½" to 6".

Built for years of trouble free service. Mechanical details on request.

THE KING ZEERO COMPANY
4300-14 W. Montrose Ave., Chicago 41, Ill.

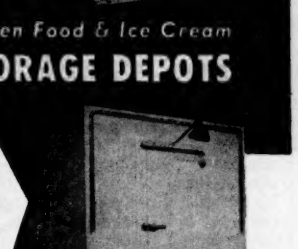
S&S ICE VENDING STATIONS
and Ice Vending Equipment

AUTOMATIC! REFRIGERATED! DEPENDABLE!



S&S Frozen Food & Ice Cream STORAGE DEPOTS

For Independent, Outside Refrigerated Storage! . . . Complete Ready to Plug In! Portable!



Slash distribution costs . . . add frozen food profits for chain stores and super-markets!

Sold by Leading Ice Equipment Distributors Throughout the Nation

S&S VENDING MACHINE COMPANY
670 Lincoln Avenue San Jose, California

valve seats of bronze and hard rubber valve discs. We always had the best results with that type of construction. Stainless steel should be ideal for this application too, but I just wonder what the expense would run of the better grade stainless as compared with bronze or K monel.—JRK.

Refrigerants Wear Out?

QUESTION NO. 1011: In the King course, section 8, chapter 15, on page 236 and 237 it is mentioned that the refrigerant in the system does not wear out. Does Mr. King mean "Freon" or ammonia? With ammonia, we believe that excessive discharge temperatures will have a tendency to break down the gas. Also, when oil mixes with ammonia it is believed that it will have an easier tendency to break down; that is, at high temperatures. Could you instruct us further?—H.C.D., Calif.

New Questions

Improvised Tunnel System Inadequate For Fast Freeze

QUESTION NO. 1012: The above sketch represents a quick freezing tunnel located at one end inside a large freezer storage room.

Air from the freezer storage room blower type evaporative unit can be diverted into the tunnel for quick freezing. Air temperatures can be reduced to as low as minus 30 F and seldom rises above 20 F even with loads of 30,000 pounds in the so-called tunnel. Loads to date have consisted of strawberries, okra, spinach and other vegetables.

When the air from the freezer room is diverted to the tunnel, the blowers deliver only 12,000 cu. ft. of their rated 19,000 cu. ft. since the damper arrangement is such. Product in the tunnels comes in at 75 F in 30-lb cans and occasionally 3-, 5- and 10-lb cardboard boxes. Occasionally some 10- and 20-oz. wax paper wrapped packages are frozen.

Our problem is we don't freeze the stuff fast enough. As near as I can figure it, we should have 600 to 800 fpm through the product to be quick frozen. With an 8 x 14 x 22 foot tunnel, I figure that we are not getting much more than 100 fpm. How can I prove this on paper to my employer? And how can I show him in figures what size fan we should use to get 600 to 800 feet? Will I have to change my coil surface? (Nameplate data of my unit is attached).—A.J.C., Chicago.

Air Purge Compressor Before Cutting Into System

QUESTION NO. 1013: Is it still dangerous to cut in a unit in the line without first pumping out the air? Where I work the engineer has cut in a 12 ton, a 15 ton and a 25 ton refrigeration compressor in the line without pumping the air out of the units with no bad effects, outside of raising the condenser pressure, which was removed by a Hill separator. Always heard a disastrous explosion will often occur. Is it because the right percentage of air is not introduced?—D.W., Mobile.

Bubbles In Receiver

QUESTION NO. 1014: What causes liquid NH_3 to bubble up in the gauge glass of the receiver? This seems to take place regardless of where the receiver is located; inside or outside a building, and irrespective of surrounding temperature at vessel. —Conley, Memphis Sec'y.

Rental Unit Charges

QUESTION NO. 1015: A room insulated with 4 in. of corkboard (8 x 21 x 8 ft. O.D.), is cooled to 36 F by ammonia in a Bush UCA 180 unit rated at 18,000 Btu with a temperature difference of 10F, or 27,000 with a 15 td.

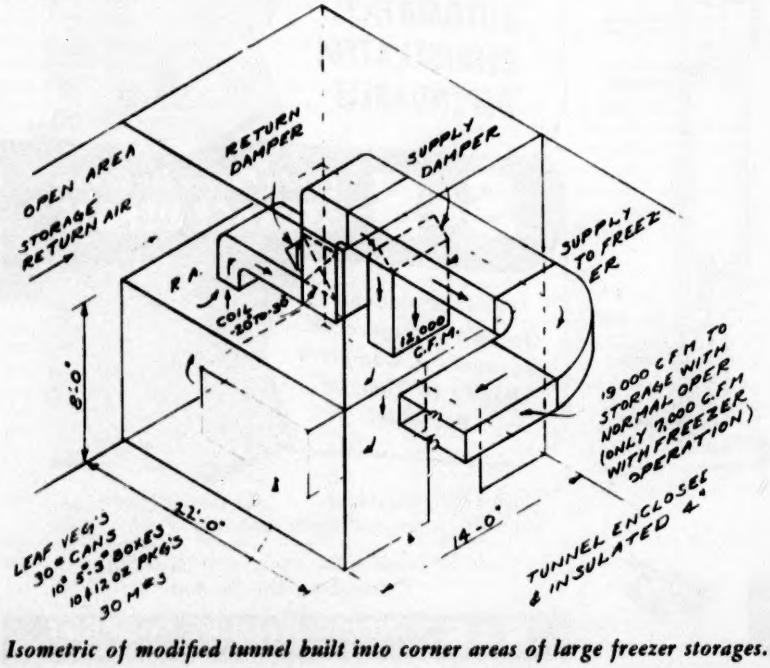
It is used to store meat being prepared to make lunch meats. The meat comes in frozen and stored in room while thawing partly, then cut into chunks, taken out of room and ground into barrels and returned into room until needed.

At present they are putting about 5000 lbs through room. I cool this room for the meat firm and they like to have a flat charge per month. Any information on charges certainly will be appreciated.—R.G.M., MAL.

Topics For Educational Sessions 45th Annual Meeting, NAPRE

SUBJECTS were announced by Pres. Leo J. Vivien during July for the engineering sessions, 45th Convention, NAPRE, to be held November 2-4 at New Orleans. Twelve in number, they cover compressors, air conditioning systems, safety, marine, electric control service and maintenance, humidity control, absorption plants, and an insulation problem. A field trip to a nearby sugar refinery has been scheduled, and the traditional Bureau of Refrigeration Information will tackle a few current problems.

According to the National President, officers, directors, national educational committeemen, and past presidents were canvassed for their views. The announced program is indicative of their expressions. Selection of the speakers has been made by Mr. Vivien, Professor H. G. Venemann and the National Secretary, Dick Kelahan. Four of the speakers were nominated by the Louisiana Chapter President Frank Chase, Marion G. Olivier, the Chapter Educational Chairman, and Addison E. Wegener, the Convention General Chairman.


OPEN AREA
STORAGE RETURN AIR
RETURN DAMPER
SUPPLY DAMPER
SUPPLY TO FREEZER
R.A.
COIL -20 TO -30
12,000 C.F.M.
19,000 C.F.M. TO STORAGE WITH NORMAL OPER (ONLY 7,000 C.F.M WITH FREEZER OPERATION)
8'-0"
22'-0"
14'-0"
LEAF VEG'S 30 # CANS 10 # 5-3 # BOXES 10 # 12 OZ PKG'S 30 MEG
TUNNEL ENCLOSED & INSULATED 4"

Isometric of modified tunnel built into corner areas of large freezer storages.

Ammonia Centrifugals

Centrifugal compressors for ammonia application will be a major topic. It is understood that only six such compressors are installed and operating at present in the United States and Canada. Their tonnage ratings range from 400 to 1400 per unit.

Air conditioning topics are several, and include high velocity systems and their controls. There will be a 5-party panel on operation and maintenance of Institution

(Continued on page 51)

Secretary Benson Thanks NARW for Support of Flexible Price Program

SECRETARY of Agriculture E. T. Benson, upon learning of the resolution adopted by the National Association of Refrigerated Warehouses at its annual meeting supporting the administration's flexible price support program, wrote the following letter to NARW President M. W. Young:

"News of the action taken by the National Association of Refrigerated Warehouses at its recent 63rd annual meeting has reached me from several sources. That action in the form of a positive resolution stating that the members of your industry favor 'a return to a flexible price support program which will not create huge surpluses and which will return American agriculture to a free and healthy economy in the true American tradition' is both commendable and newsworthy.

"I admire very much this heartening and unselfish attitude, and the example of fine business statesmanship it reflects among the members of your industry.

"It is my pleasure to congratulate the Refrigerated Warehousing Industry, through you, and to thank you wholeheartedly for your support of the Administration's program for a sound agricultural economy."

The association in adopting this resolution pointed out that it did so in the interest of encouraging a stable economy even though the warehousing industry is a direct beneficiary of the present high rigid support program for agricultural commodities, as members store millions of pounds of perishables procured by the government under the program.

Consolidated Terminal Sold to American Ice

ALL assets of the Consolidated Terminal Corp., wholly-owned subsidiary of Terminal Refrigerating & Warehousing Corp. of Washington, have been sold to the American Ice Co.

The ice business of Consolidated will be continued, it was understood, but the fuel oil and coal lines may be disposed of by the new owners. Joseph B. Elliott, newly-named manager of the Consolidated Terminal Division of American Ice Co., said yesterday that the division will operate the same four locations as previously with about 40 men and 15 vehicles.

Sale of Consolidated Terminal was made by Merchants Terminal Corp. of Baltimore, which in May purchased control of the 84-year-old Terminal Refrigerating & Warehousing Corp. of Washington.

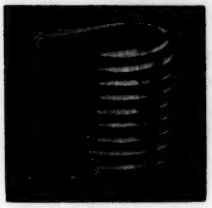
Consolidated was organized in 1936 through the merger of four smaller area companies. They were the Virginia Ice & Fuel Co., Takoma Ice & Fuel Co., Hyattsville Ice & Fuel Co., and Terminal Ice & Fuel Co.

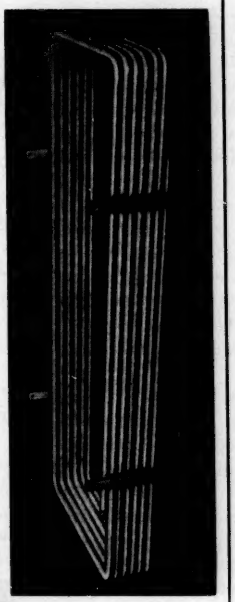
In 1940, Consolidated purchased the ice business of Heurich Brewing Co.

New "Cave" Storage in Kansas

A FOUR million dollar refrigerated storage project is planned for a large cavern southwest of Turner, Kansas on the Santa Fe railroad near Kansas City. The first unit is scheduled for completion early in October. It is reported that 2,500 carloads of frozen foods can be stored in the subterranean warehouse at subzero temperatures. Floor space to be occupied at present will be slightly less than nine acres.

PIPE BENDS & COILS





To do your job *as you want it done*, takes proper equipment, skill, experience, "know-how"! Your specifications exactly reproduced by our master metal-workers in all metals, even stainless steel, and up to 6-inch extra heavy. Complete welding facilities. Over 35 years of experience assures fine quality custom work. Call on us!

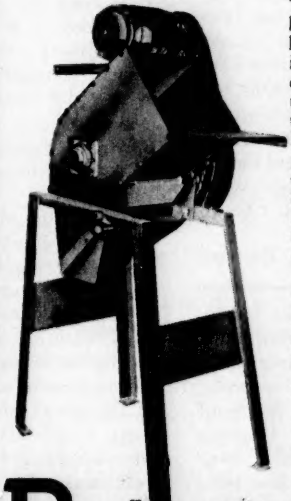
1997 Clybourn Ave., Chicago 14

CHICAGO NIPPLE MANUFACTURING CO

We'll gladly quote on your next job

Regal 25

ICE CRUSHER



The New REGAL Model 25 has all steel frame legs, grate handle and grate. Self-aligning ball bearings. Legs high enough for 25-lb. paper bag to be filled. Galvanized for the prevention of rust. ¾ HP. motor. Direct drive, no gears. Shelf for placing ice on before entering hopper. Slanting hopper for easy loading. Four grate adjustments by turning the handle on side of crusher. Makes a very good fine ice on grate closed. Will take long 50-lb. blocks in hopper. Two belts for sure pulling power. Belts and motor pulley furnished when crusher is ordered without motor. Delivery can be made on receipt of order. Guard covers the flywheel and motor pulley.

Price $149.00, less motor. Motor at prevailing price.

Write For Full Information

Bateman Ice Processing Equipment

MINERAL WELLS, TEXAS

New Aluminum Alloys Provide Tensile Strength For U.S. Stratojet Bombers

PRECISION control of heat treating operations and artificial age hardening is essential to production of aluminum alloy parts of high tensile strength and corrosion resistance for United States Air Force's B-47 Stratojets. Anyone watching the bombers screaming through the sky at speeds in the 600-mile-an-hour neighborhood can't help but wonder how these gleaming monsters can keep from disintegrating under the tremendous forces and strains to which they are subjected in flight. Although the answer lies largely in the design of the plane, which is very highly stressed for 600-mile-an-hour-plus speeds, it is the tensile strength afforded by stronger, new aluminum alloys that makes possible the amazing performance of the B-47.

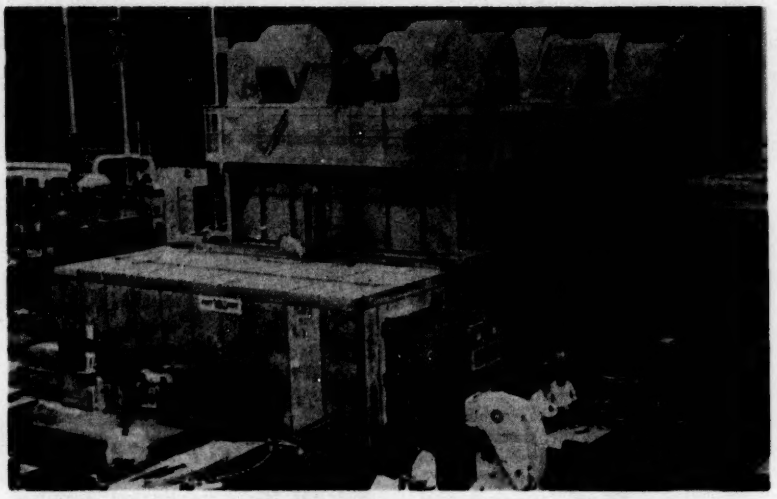
However, the mere fact that these alloys are used is no assurance of safe or satisfactory flight, for their efficacy depends entirely upon precision heat treatment in which both time and temperature play vital roles. A variation of a few degrees or a few minutes in the heat treating operation can cause a dangerous reduction in the tensile strength of the light aircraft metal.

Heat treating of aluminum alloys at Lockheed Aircraft Corporation's Georgia Division at Marietta, Georgia, is carried out in six electrically fired furnaces of the latest type. Three are Knapp-Lee solution heat treating furnaces, and three are Lanly aluminum aging furnaces. All are equipped with Brown ElectroniK instruments that automatically control furnace temperatures and continuously record both the temperatures and the time of the heat treating operations.

Solution heat treatment, the first step in the heat treating operations, consists of forming a solid solution of alloying constituents in the aluminum. In the case of two aluminum alloys, this involves heating the metal to 930 F. So critical is the timing of this operation, and of the quenching operation that follows, that specifications call for the aluminum to be quenched in a water bath within 7 seconds after the heating period has ended. Should the temperature exceed 930 F in the solution heat treatment, eutectic melting occurs along the grain boundaries and results in a serious lowering of mechanical properties.

Should the alloy be removed from the furnace before the heat treating process is completed, the proper solid solution and precipitation of the alloying constituents will not develop. This condition will cause a reduction in the mechanical properties, tensile strength, and corrosion acceptability of the alloy. Moreover, should more than 7 seconds elapse between the completion of heat treating and the beginning of the quench, corrosion resistance and tensile strength will both suffer.

The Knapp-Lee furnaces illustrated in Fig. 1 are specially constructed to permit rapid quenching. Parts to be heat treated are loaded on wire hangers in tubular steel carts which are rolled onto the tables of hydraulic hoists. The hoists raise the work loads up into the overhead electric furnaces. After being heat treated, the parts are quickly lowered and submerged into water tanks located below the furnaces.



Refrigerated compartment used to arrest aging of aircraft aluminum alloys is pictured in left center foreground. This room is held at minus 10 F, which stops completely natural hardening until sections are hammered, tooled or shaped to final form. Three 1500 ton heat treating furnaces are behind the cold box. — Photo courtesy Minneapolis-Honeywell Regulator Co.

Artificially Induced Old Age

After solution heat treatment, aluminum alloys have the characteristic of gradually becoming harder and developing greater tensile strength with age, a process known as age hardening. One alloy requires from 4 to 8 months to age harden at room temperature. Some alloys will never reach maximum tensile strength at room temperature.

The natural age hardening process can be stopped completely if the alloy is placed in cold storage immediately after it has been solution heat treated. This characteristic is taken advantage of since it is normally the practice to form, hammer, or otherwise shape the parts to desired dimensions before the hardening begins. Parts from the quench tank are placed in a freezer compartment (visible center foreground in the illustration) and held at minus 10 F until ready for fabrication, sometimes a period of several days.

(Continued on page 53)

In an article "Sinews for the Stratojets" which appeared in "Instrumentation" published by Minneapolis-Honeywell Regulator Co. recently, S. G. Andrews and H. H. Smith of Lockheed Aircraft Corp., Georgia Division, give detailed steps of heat treating, age arresting by low temperature refrigeration, and artificial age hardening of aircraft aluminum alloy components. This article is a condensation. Mr. Andrews is department manager and Mr. Smith, supervisor, Process Control, Lockheed, Marietta, Ga.

Dairy Support Purchases Summarized

THE U. S. Department of Agriculture has reported that purchases of dairy products by the Commodity Credit Corporation under the price support program during the month of June 1954 amounted to 65,635,926 pounds of butter, 33,421,182 pounds of cheddar cheese, and 98,069,804 pounds of nonfat dry milk solids. These compare with purchases of 66,804,733 pounds of butter, 40,827,696 pounds of cheddar cheese, and 84,440,119 pounds of nonfat dry milk in June 1953.

Although overall production of these three products has been running about five percent ahead of a year ago, a comparison of CCC purchases for the first three months of the current marketing year (April-June) with those for the similar period of a year ago shows that butter purchases are below a year ago, cheese considerably less, and nonfat dry milk above. This reflects an increased movement of these products, particularly of butter, into commercial trade channels. Since April 1 of this year, purchases have amounted to 125 million pounds of butter, 65 million pounds of cheese, and 215 million pounds of nonfat dry milk. During a similar three-months period a year ago, purchases were 134 million pounds of butter, 103 million pounds of cheese, and 205 million pounds of nonfat dry milk.

Distribution and sales of dairy products by the CCC during June totaled 13,373,302 pounds of butter, 13,950,366 pounds of cheese, and 40,197,514 pounds of nonfat dry milk. Of this total, commercial export sales amounted to 136,248 pounds of butter, 32,339 pounds of cheese, and 392,730 pounds of nonfat dry milk. Commercial sale of cheese for domestic use amounted to 5,182,042 pounds. Sales to the U. S. Army amounted to 1,653,416 pounds of butter and 127,061 pounds of cheese, and 33,360 pounds of butter were sold to the Veterans Administration.

In addition, 60,000 pounds of butter were sold under a special program for use in extending cocoa butter. Sales of dry milk for poultry and livestock feed totaled 39,354,984 pounds. Distribution for domestic school lunch and welfare use and for foreign welfare feeding amounted to 11,460,278 pounds of butter, 8,608,924 pounds of cheese, and 449,800 pounds of nonfat dry milk.

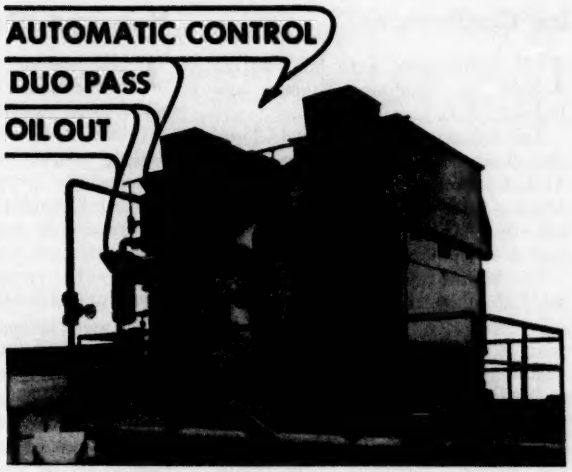
Government Control Ahead?

THIS YEAR, and particularly for the past two months, there has been much comment in government and industry about the possibility of another Federal Controls program, according to Ice News issued by The National Association of Ice Industries.

The feeling about the need for controls has fluctuated from week to week — so much so that it has been impossible to accurately separate rumors from facts.

This we know, however, the Department of Commerce has now a set of proposed control orders comparable to those to which the economy has been subjected twice in 12 years. They include: allocations and priority procedures, price, wages, and installment credit (Regulation W.).

We don't claim to know what the future holds. Moreover, we don't want to be guilty of stimulating any false impressions. World affairs at the present are very much in the balance. Therefore, we are of the view that you should be informed of the fact that the government seems sufficiently concerned that such measures have actually been drawn and are now on paper —N.A.I.I. ICE FACTS



SAVE HALF THE ENGINEER'S TROUBLES WITH A REFRIGERATION PLANT

Hundreds of engineers have been interviewed about their experience with the Niagara Aeropass Condenser. In one way or another, they say, "I wouldn't go back to anything else." And their managers, who watch costs, say, "Best investment we ever made, couldn't operate now, without it."

Niagara Aeropass Condensers have three exclusive features which save trouble and money in running a refrigeration plant:

"The Duo-Pass"— keeps scale and salts from crusting the coils, keeps the condenser always at full capacity.

The "Oilout"— removes oil and dirt from the refrigerant, at the exact point where the oil vapor is condensed and the refrigerant is not.

The "Balanced-Wet-Bulb" control gives automatic operation at the minimum head pressure, saving power cost the year 'round!

In addition, the Niagara Aeropass Condenser saves nearly all your cost of cooling water, quickly bringing back to you the cost of installation. In plants where refrigeration is a production process, owners know that this condenser has reduced their costs.

Write for Bulletin 103; Address Dept. IR
You can see one of these installations near you.

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

Ice Conferences

ICE conferences were held during June in Atlanta; Miami; and Raleigh, N.C.

The Atlanta meeting was held Tuesday, June 1, at the Georgia Hotel. A. J. Gordon, Vice President of the Atlantic Company, Atlanta, and member of NAII's Executive Committee served as moderator.

The Miami Conference convened at the Columbus Hotel, Miami, Thursday, June 3, E. L. Gunn, Jr., President of American Service Company, Atlanta, and First Vice President of NAII, moderated the meeting.

The Conference at Raleigh was held at the Sir Walter Hotel, Tuesday, June 8. Members of the Industry from North Carolina, Virginia, and Florida were present. George Sherrod, President, Greensboro Ice & Coal Company and member of the NAII Board of Directors, was the moderator.

A one-day conference for the Eastern States was held at the Governor Clinton Hotel, New York City, July 20.

NAII Staff Members Jobe and Austin presented the National Association's part on the program and participated in the discussions.

New Iced Wine Campaign

THIS summer the California wine industry is conducting a nationwide sales campaign for iced wine drinks. Spearheaded by attention-getting display material, the drive stresses the growing popularity of the wine cooler as an allpurpose beverage that can be made quickly and with a minimum of mixing and fuss. The campaign is aimed at every major market in the country.

To make a sparkling wine cooler, one simply pours half a glass of his favorite California wine, adds plenty of ice and fills the glass with plain or fruit-flavored soda. A dozen different types of soda can be used, as well as almost any type of California wine. After a few interesting and tasty experiments, the wine cooler fan will choose his own favorite out of the several combinations.

The sales drive has gained added momentum from tie-in activities of many soda beverage bottlers. Since the campaign means additional ice sales, it should have the iceman's support. With a boost from him, this summer campaign should be even more successful than last year's when sales of both California wine and carbonated beverages increased.

Truck Icing Manual

A TRUCK icing manual has been released by City Products Corporation listing more than 130 truck icing stations and its 18 cold storage plants. The ice stations are listed by state and city. The street address, how to reach it from principal highways servicing the area, and telephone numbers are all included. An asterisk is used to identify places where blower service is available.

All of this useful information is presented in a convenient pocket and glove compartment size (3½ x 8½ inch) booklet. The cover carries out the red and yellow colors which are used company-wide to identify vending stations and other outlets for Ice.

Vended Ice Advertised

THE advantages of purchasing ice cubes and block ice from vending machines were effectively presented in a recent double-page multicolored Sunday advertisement by City Products Corporation of Miami.

The advertisement in the form of an illustrated feature story ran in the Florida Living section of the Miami Daily News.

Valves and Fittings

Offer to the refrigeration and other industries a complete line, in sizes from ¼" through 14". Backed by a century of engineering experience, these valves and fittings bring you many special advantages. Stocked in principal cities the world over. Get your copy of Catalog O now.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

BOWER
B B BRAND
AMMONIA

Anhydrous Ammonia
Cupric Chloride
Ammonium Bicarbonate
Anhydrous Calcium Chloride, purified

Please keep empty cylinders rotating.

Est. 1858

HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29TH AND GRAY'S FERRY ROAD
PHILADELPHIA 46, PA.

Low Temperatures Used by Industry

RESEARCH at temperatures near absolute zero (−460°F.) is beginning to pay off industrially. Many of the phenomena noted at these ultra-low temperatures have been of interest primarily to scientists exploring the properties of matter and the structure of the atom. Others offer possibilities for eventual application, but a few have already been put to use by industry.

Helium is used in the refrigerated storage of liquid air, oxygen, nitrogen, and hydrogen, at temperatures down to −420°F. These "gases" are now available as liquids in high purity and large quantities, at low cost. For example, oxygen can be both liquefied and transported or stored for extended periods, as might be required for submarine or rocket use, without measurable loss through evaporation, using liquid helium as a refrigerant. One installation now in operation consists of a hydrogen liquefier with a capacity of 18 liters of liquid hydrogen per hour, and a built-in storage capacity of 800 liters. The liquid hydrogen is kept at atmospheric pressure with a helium refrigerating system. Another installation liquefies 50 pounds of gaseous oxygen per hour, and is used to reduce boil-off losses in a large liquid-oxygen storage plant, used as the source for high-pressure oxygen for acetylene cutting, or replenishing breathing oxygen supplies.

It is more economical to ship and store such gases as oxygen, argon, nitrogen, and helium in the liquid phase, from the point of view of saving both space and weight. Lighter containers may be employed, because of the lower pressures involved. Special advantages in purity of product also accrue from the generation of these gases from the liquid phase. The gases are essentially free of water, and helium gas generated from its liquid is free of all contaminants, since liquid helium is at the bottom of the temperature scale.

Upgrading Natural Gas

Another application of ultra-low temperatures, now being considered, is in upgrading natural gas. Much of the gas now used is contaminated with nitrogen and other non-combustible gases as it comes from the well. By liquefying the bulk of the stream, the nitrogen could be vented off as a gas, leaving a larger proportion of combustibles to be carried in the pipeline at the same cost, or possibly transported in bulk as a liquid.

Similarly, hydrogen, which is increasingly important to industry, could be recovered from gas streams coming from the catalytic cracking or reforming operations of the petroleum refining industry. Because hydrogen has a lower boiling point than the other components, separation could be accomplished by low-temperature condensation of all components except hydrogen.

The electronics industry is already familiar with the use of refrigerated traps for vacuum work. Vapors may be pumped faster by exposing them to a cold surface than by a mechanical or diffusion pump. At liquid-helium temperatures, all substances except helium itself are solids, with completely negligible vapor pressures. A liquid-helium cold trap may therefore serve as a vacuum pump for all gases except helium. Fast pumping for processing delicate materials might be handled with this technique.

Another interesting use of helium refrigeration is in cooling sensitive electronic equipment to cut down random "noise" due to thermal agitation. Moreover, since pure helium does not become radioactive, it is especially useful as a coolant for processes carried out under conditions where strong radioactivity is encountered. It is paradoxical, but a logical development of research, that helium, first noted in the spectrum of the sun's atmosphere, should find its major applications where extreme cold is required.—Industrial Bulletin

New Thermal Insulation For Household Refrigerators

HOW scientists of the General Electric Research Laboratory applied scientific principles to the development of a new thermal insulation for household refrigeration has been disclosed by Dr. C. Guy Suits, GE vice president and director of research.

Up to now, with the exception of the thermos bottle and Dewar flask, the best thermal insulation found consisted of finely divided matter in either powder form or fibre form such as asbestos or glass wool. "One of the important functions of such finely divided material in insulation", Dr. Suits declared, "is to immobilize air. It is the circulation of air due to convection, which transfers most of the heat in insulation. Hence, if the air can be immobilized in the interstices of the insulation, the transfer of heat is prevented."

The principle of the thermos bottle was obviously far superior to any other fundamental yet known, Dr. Suits asserted, explaining that it couldn't be applied to a household refrigerator earlier because refrigerators have flat panels rather than self-supporting walls. The problem was to support these flat panels, without conducting appreciable heat, against the crushing strength of atmospheric pressure (more than a ton for each square foot).

"How to accomplish this requirement was discovered recently in the G.E. laboratory. "This new flat panel vacuum insulation is the most perfect heat barrier ever devised," Dr. Suits said. "It is from ten to thirty times more effective than the best flat insulation in common use, and in its best form, is three times better than the Dewar flask or thermos bottle."

Produce Manual Covers Iced Displays

IN its Produce Manual (March issue) Chain Store Age devoted the same amount of space and attention to iced displays that it gave to dry and mechanically refrigerated units. The ice display is illustrated with a beautiful display case employing the channel method. Brief descriptions and evaluations of the dry, the mechanically refrigerated, and the iced method, accompany the photographs. Comments on the iced unit are as follows:

"Iced Displays are found both in refrigerated and unrefrigerated cases. Ice in bed form and channel form offers moisture- and temperature-control to keep produce fresh looking. The cost of melting ice and the difficulty of obtaining mass displays with iced produce have limited this method in some instances. Iced refrigerated displays best preserve produce freshness. Managers can capitalize on this advantage in the display."

Tests and experience up to this time indicate that the channel method substantially reduces the cost item referred to in the above text material.

New Hide Storage

THE Lannom Mfg. Co., Tullahoma Tenn., plans early construction of a new refrigerated building for storing hides and a new warehouse. The hide storage building, to contain approximately 2400 square feet, will be located near the firm's tannery. The warehouse of approximately 3600 square feet will be constructed on the new Shelbyville (Tenn.) highway. Estimated cost of the construction program is placed at over $20,000.

The Turkey Market for 1954

HERBERT BEYERS
Norbest Turkey Growers Association
Salt Lake City, Utah

IF producers carry out their reported intentions to raise six percent more heavy breed turkeys in 1954 and nine percent more light breeds, this year's crop will total approximately 59,600,000 head, against 55,700,000 last year.

For a great many processors, capital will be their largest single problem. A modern sub-scald plant meeting government inspection requirements, with sufficient freezer capacity to operate efficiently, will cost from $250,000 to $400,000, four to six times the cost of the regular New York dressed, semi-scald plant with coolers. More funds must be tied up in packaging materials and it takes longer to put the birds through the plant.

Packaging problems are not yet solved and will still create troubles in 1954. Many a processor may find that his bulk pack is not wanted, and that individual cartons are favored. They must spend much time and effort to get producer cooperation, especially in marketing birds at the weights needed. It will take a fairly long operating season, combined with a steady flow of volume, to make a profitable plant operation.

On the distribution side, there are still thousands of smaller cities and villages where retailers have good freezers and where turkeys are sold only during the holidays. The greatest bottleneck we face throughout the country is the continued reluctance of the retailer to stock turkeys out of season. It will take time and patience to continue to explain to retailers the value of pin-free, ready-to-cook, quick-frozen, properly graded and packaged birds that do not depreciate in stock when kept frozen, that these turkeys will give the retailer a fair profit margin when stocked regularly, and that they come in sizes from 4 to 24 pounds.

We now consume between five and six pounds of turkey per capita, an increase of more than 100 percent since 1940. If the present trend continues, it is possible to reach 10 pounds per capita by 1965. To dream a bit, 10 pounds per person, times 175 million people, gives us a billion and three-quarters pounds of turkey meat, about 116,600,000 birds. This isn't impossible but it will take years of planning,

---

Summary of paper at Fact Fnding Conference, Institute of American Poultry Industries.

Sub-Scald Turkeys Present New Handling Problems

A. A. KLOSE
Western Utilization Research Branch,
U. S. Department of Agriculture

OUR tests show that rancidity development during frozen storage is no greater in subscald turkeys than in semiscald, so flavor is no problem. But when it comes to the effect of subscald on tenderness there are conflicting reports. Some investigators have indicated subscalding produces a toughening effect, while others have differentiated between the effects of the scalding temperature and scalding time, concluding that a higher temperature for a shorter time may lead to a more tender meat.

It has been suggested that the finish (amount of fat in the skin) may modify these effects. Our work has shown no differences in the tenderness of the meat, due to changes in the scalding temperature, with time of scald held constant. More work is needed to clear up these discrepancies.

Tenderness of the cooked skin, however, is a different story. Birds scalded at 140 F develop a much tougher skin during ordinary roasting, than those scalded at 126 F. This toughening may be reduced in part, but not eliminated, by covering the roasting bird with oiled cheese cloth. Accompanying the toughness, there is also a wrinkling of the skin.

Summary of paper at Fact Finding Conference, Institute of American Poultry Industries.

The loss of the cuticle in subscalding accounts for the marked contrast between the diffused white color of the semiscald turkey and the shiny pink color of the subscald. The standards of perfection for the two products are different.

Loss of moisture in subscald birds is accompanied by an objectionable darkening, which may develop within an hour in the open air. The dehydration and darkening at this stage can be prevented either by slush ice or cold water chilling, or by immediate packaging and freezing. In freezing, the skin may be cooled to the freezing point so slowly that it has ample time to dry in the thawed state, shrink, and become darker. Also, in slow freezing, ice crystals are larger, causing more darkening. Rapid refrigeration will minimize these changes.

So far we've found that a minus 20 F., 1330 feet per minute blast on plastic bagged but unboxed turkeys produced a light appearance. When bagged turkeys were placed in a wire-bound wooden box, however, and the box surrounded by boxes on all sides to stimulate conditions in a heavily loaded tunnel, freezing time was lengthened to the extent that a significantly darker appearance developed.

Skin tight packaging will help to prevent formation of dehydrated and freezer burned areas on the skin during the freezing operation. Differences in the finish of birds may exert a greater effect on the final appearance than small variations in chilling and freezing.

Locker Operators Hear Safety Story

W. F. Leonard shows some safety statistics at Texas Locker Meeting.

AN OUTSTANDING safety talk was given at a meeting of the Texas Frozen Food Association at Fort Worth, Texas, by W. F. Leonard, Jr. chairman of the Ice, Cold Storage and Locker Plant Division of The National Safety Council. Mr. Leonard showed a total of 26 charts similar to the one in the above picture, outlining points in his talk covering safety hazards in locker plants, the work of safety supervisors, and methods of training employees in traffic safety.

Book Review

ELEMENTS OF FOOD ENGINEERING. By Milton E. Parker, E. H. Harvey, E. S. Stateler, Published by Reinhold Publishing Corp. New York. 360 pages. Illustrated. Price $8.50. For sale by Nickerson & Collins Co. 433 North Waller Ave. Chicago, Ill.

Published in three volumes, this book treats the production, preparation, processing, handling and distribution of foods, from the unit operation and unit process points of view. As such it presents important information for the profession of food engineering. Volume 1 outlines the engineering factors involved in food processing. Volumes 2 and 3 present a unified discussion of unit operations grouped according to specific functions, as a treatise on the new field of food engineering, it will be of outstanding interest to engineers, chemists and technologists in all of the food processing industries.

More Iced Tea Posters

BASED on the number of iced tea posters that the membership used last year, the National Ice Association started this year with a supply adequate for two or three years, but much to their surprise they received so many orders they were completely out of posters in a few weeks. Unfortunately, the supply was used up before a lot of Icemen who wanted posters got them.

This was reported to the Tea Council, and they very kindly made an unscheduled run of additional posters. The new posters are 20½ x 30½ inches. Icemen who failed to order or didn't get as many as they need are advised to write for a new supply.

Ice Cream Plant Enlarged

THE RICH Ice Cream Corporation of Buffalo, N. Y. has started construction of a large addition to its Rochester servicing and distributing plant that will increase the size of the present unit there about sixfold. President Paul Rich Jr. said the addition will cost about $250,000, and will be completed in the Fall.

Court House Air Conditioned

A CONTRACT has been let for air conditioning the DeKalb County Court-House at Fort Payne, Alabama. Air conditioning equipment will be installed in the Circuit Courtroom and in all the offices on the first, second and third floors.

New Warehouse Announced

PLANS for reconstruction of a two million dollar office and warehouse building at Trenton, N. J., has been announced by Louis H. Cahan & Company, Trenton and Philadelphia. The building will be three stories high with 75,000 square feet of warehouse space on the ground floor including refrigeration facilities and similar areas on the upper floors for offices.

Creamery Builds New Storage

A BUILDING permit for the construction of a storage building at Sixth street and Tyler avenue has been issued to The Beatrice Creamery Company at Joplin, Mo. The company will use the new storage building for storing their Meadow Gold products. The storage plant and offices will be moved from 505 Virginia avenue to the location at Sixth street and Tyler avenue.

install
peak performance
into your
compressors
(AIR · GAS · AMMONIA)

Peak performance, maximum efficiency, greater output, and lower power costs can be built into your oldest, and of course your newest, compressors by the installation of VOSS VALVES.

Check THESE VOSS VALVE ADVANTAGES:

✓ Quiet, vibration-free operation ✓ 20 to 60% more valve area ✓ less power consumption ✓ minimum pressure loss ✓ normal discharge temperature ✓ lower operating costs ✓ utmost safety

Our detailed proposal for increasing the efficiency of your compressor will be sent you without obligation. Send us the name, bore, stroke, and speed of your machine.

VOSS VALVES

REFRIGERATION COSTS REMAIN UNCHANGED FOR MANY YEARS

By Philip D. Sang, Vice President,
Goldenrod Ice Cream Co., Chicago, Ill.

"Over a period of 23 years we constructed seven ice cream hardening rooms, using cork insulation. In 1935, after consolidating production in one plant, we commissioned United Cork Companies to design and construct a new hardening room of the most modern type and efficiency. This was to maintain a temperature of –40° and called for 8000 sq. ft. of surface area.

"This room proved so successful that another room was built in 1945. So far as we can ascertain, the consumption of electricity for refrigerating these rooms is now no greater than when they were new.

"If called upon for further expansion, we would certainly again use corkboard insulation."

Integrated Responsibility

A major factor in the effectiveness of United BB Corkboard in this and thousands of other installations in meat, milk, frozen food plants and other applications requiring low-temperature insulation is to be found in the unified responsibility of United Cork Companies . . . from selection of the grades of raw materials imported to the erection of the complete job.

Cork itself, of course, has unique natural insulation properties, and United Cork's patented process of block baking (BB) the cork granules into corkboard without the use of any binder makes most effective use of these natural advantages.

Each installation of United Cork BB Corkboard is planned by engineers thoroughly experienced in the requirements of refrigeration work. These engineers are located at each of United Cork's branch offices throughout the country. They are prepared to cooperate with architects and general contractors in designing low-temperature insulation as an integral part of the complete building.

United Cork Companies' erection crews, which are also located at each of the branch offices, then take the engineering blueprints and convert the designs into a finished insulation job. The branch office concerned also checks on the operating effectiveness of each installation to assure complete customer satisfaction.

If you would like to know more about the scope of United Cork Companies' service—and about the ways in which installations have stood up under the toughest conditions—just drop a line to United Cork Companies, Dept. I-6, Kearny, N. J.

Dried Whole Milk

INTENSIVE investigations of off-flavors in dry whole milk are under way at Pennsylvania Agricultural Experiment Station, State College, Pa., and first results have been reported in a short article by Patton, Keeney and Herald in Science, Feb. 12, 1954. These workers have centered their attention on a coconut-like off-flavor that develops in dry whol milk and milk fat. Efforts at prevention by such measures as vacuum packing, packing in inert gas or addition of anti-oxidants have proved to be unsuccessful. The only satisfactory preventive they have found has been low-temperature storage (32 F. or lower).

Their main effort is directed toward an understanding of the chemical compound or compounds that are involved in the development of coconut-like flavor and they report evidence in some detail that the cause is a lactone derived from decenoic acids which are absent in most other fats. The inference can be tentatively drawn, of course, that here is chemical reaction that causes off-flavor that cannot be prevented by any chemical means known. Refrigeration, however, is effective in stopping the chemical change.—TRRF. Information Bulletin

Hearing on Refrigeration Increases Postponed

IT APPEARS unlikely that the fruit and produce shipping industry will pay proposed increases in refrigeration costs asked by the railroads this season.

From information received at the office of the Northwest Horticultural Council in Yakima it was learned that the hearing originally scheduled for July 13 at Washington, D. C., has been postponed until October 12.

The council and other interested shipper groups requested the postponement because of the delay of the part of the railroads in furnishing accurate cost figures.

Ernest Falk, Yakima manager for the council who is now at Washington said: "It will be that much longer before any action is taken in the case, making it highly improbable that increased refrigeration charges, if granted by the Interstate Commerce Commission, will go into effect in the coming shipping season."

Fluorescent Lighting For Freezers

PROGRESS in studies in the plant of National Terminals Corp., Cleveland, on fluorescent lighting for freezers is reported by Dana W. Rowten, manager Lighting Design Section, Westinghouse Electric Co., Cleveland. The experiments began in July 1952. In a short time, Westinghouse Engineers licked the starting problem. By improvements in ballast and design, they eventually completed the exploratory work on a lamp that will meet requirements. The next problem was development of a luminaire to contain ballast and lamp and meet all requirements for a zero room. Pilots for trial are undergoing construction and installation, and all interested parties will have an opportunity to appraise them during the testing. The Refrigeration Research Foundation participated under the short term project arrangement and National Terminals Corporation cooperated.

Swift Plans New Branch Plant

A LARGE tract of industrial property has been purchased at Buffalo, N. Y. by Swift & Company which plans to erect a new branch plant to serve the Buffalo area. The property covers about 143,000 square feet. No slaughtering operations will be carried on in the new plant.

June Cold Storage Holdings

A JUNE net increase of more than 40 million lbs. of butter and almost 39 million lbs. of American cheese brought June 30 holdings of butter up to 462 million lbs. and American cheese to 533 million lbs. Butter stocks were more than three times the June 30 average stocks while American cheese stocks were more than twice the average. A 16 percent gain in stocks of frozen fruits brought U. S. holdings up to 232 million lbs. by June 30 while frozen vegetable stocks, which decreased by 1 percent, were down to 441 million lbs. Seasonal gains raised U. S. holdings of shell eggs to 1.6 million cases; frozen eggs to 188 million lbs. A significant reduction in poultry stocks brought total holdings down to 152 million lbs. by June 30. Red meat stocks, also, were down from the month before. June 30 stocks at 600 million lbs. compares with 653 million on May 31 and 749 million this time last year.

Steel Wage Boost Affects Other Industries

THE settlement of U.S. Steel with the CIO for a 5 cent hourly wage boost follows the pattern being set in a number of other industries. The new steel contract also calls for fringe benefits amounting to about 7 cents an hour. Bethlehem Steel has already signed the same basic contract and the rest of the industry is expected to follow suit. The price of steel has already been raised about $3.00 a ton as a result of these increases.

This, of course, will affect steel users all along the line and is bound to have a mild inflationary effect, especially when taken along with easier housing credit, reduced reserve requirements for Federal Reserve banks and other economic stimulants.—NARW Quick Sheet

Air Conditioning Exposition in Philadelphia in 1955

THE International Heating and Ventilating exposition, also known as the air conditioning exposition, will return to Philadelphia, where it was last held in 1951, for the twelfth biennial session, January 24-28, 1955. The American Society of Heating and Ventilating Engineers, whose sixty-first annual meeting will occur during the same week, is sponsor for the exposition. The exhibit will occupy the entire facilities of the Commercial Museum and Convention Hall.

Louisville Warehouse Declares Dividend

A DIVIDEND of $10.50 a share of preferred stock to take care of past due dividends has been declared by directors of The Merchants Ice & Storage Co. Louisville, Ky. The payment of these accumulated dividends totals $49,633.50. The company has been in default on preferred stock dividends since December, 1932.

COMING CONVENTIONS

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 2-4, 1954
Roosevelt Hotel, New Orleans, La.
J. RICHARD KELAHAN, Secretary

NATIONAL ASSOCIATION ICE INDUSTRIES
November 9-12, 1954
Netherland Plaza Hotel, Cincinnati, Ohio
GUY W. JACOBS, Executive-Secretary

Prevent
COLD ROOM LOSS

with . . .
AIR-LEC DOOR OPERATORS

Air-Lec, shown installed above the cooler door, opens and closes the heaviest doors quickly, safely and smoothly at the touch of a switch or the light pull of a cord. Available with Mechanical Trip for one or two operating stations above each door approach, or with Electrical Switch for more and distant stations. Air-Lecs are in use in thousands of factories, food freezing and storage plants, meat packing companies, garages and service stations. Speed and Safety are characteristic of Air-Lec because Air-Inertia-Spring, all elastic forces, are the patented forces used.

AIR-LEC FOR TYPICAL COOLER DOOR. . **$65.00**

. . . AND AIR SEAL

Installed at left of door in illustration, the Air Seal operates in conjunction with Air-Lec, to provide an absolute seal on cooler doors. Air Seal crowds the outer edge of the door to stop improper circulation and frosting. Air Seal is especially desirable where temperatures below freezing are maintained.

AIR-SEAL. $25.00

NOTE HOW THEY RE-ORDERED AIR-LECS

	Recently Ordered	Now Enjoy
California Consumer's Corp. Los Angeles, California	1	4
Gerber Products Co. Fremont, Michigan	1	20
Wm. Wrigley Jr. Co. Chicago, Ill.	2	22
Cascade Frozen Foods, Inc. Burlington, Washington	1	3

Fill in and return the coupon today for complete information.

SCHOELKOPF MFG. CO., Madison, Wis.
Cooler Doors are ___ Ft. Wide, ___ Ft. High. Air Pressue ___
Open Toward Warm Side, Cold Side.
Firm Name _____
Address _____
By _____ _____

SCHOELKOPF MANUFACTURING CO.
312 N. THIRD ST., MADISON 4, WIS.

Ninth International Congress to Meet in Paris, Aug. 31 to Sept. 15, 1955

THE Ninth International Congress of Refrigeration will be held at Paris, France from August 31 to September 15, 1955, at the Sorbonne. The Congress thus returns to Paris after an interval of nearly 50 years, the First International Congress having been held there in 1908. The general secretariat of the Congress will be located at the headquarters of the International Institute of Refrigeration 177 Boulevard Malesherbes, Paris.

Regulations have been issued from Paris governing the preparation and presentation of papers for the congress. These are dealt with in eleven articles framed by the I.I.F. The main provisos state that papers shall be connected with one of the items figuring in the program. Such documents should bring to the subject dealt with new elements of knowledge and appreciation. The text of any paper shall not have been already published in any shape or form. All advertising of a commercial character — even indirect — shall be rigorously excluded.

Papers Committee

The papers committee of the Ninth Congress will assume the responsibility of determining whether the papers presented conform with these conditions. Reports submitted must not exceed 2,000 words and summary of 200 words must be attached to the report. The reports must be sent to the Papers Committee of the congress, International Institute of Refrigeration headquarters, 177, boulevard Malesherbes, Paris (17). Abstracts must reach the committee not later than January 1, 1955, and the corresponding main reports before April 1, 1955; each of these documents must be sent in triplicate. Units of measurement should preferably be in the metric system.

A draft program of the congress has already been drawn up as regards the business sessions. This program is divided into two parts: First, plenary sessions for the discussion of pre-cooling in its wider meaning (cooling of commodities before storing or transport) and regarding different methods (tunnels, cold stores, inside vehicles, etc. . .); problems concerning education in refrigeration (present and future needs); air treatment in cold chambers (chemical composition of the atmosphere, relative humidity, deodorization, purification . . .); refrigeration as regards problems of nutrition and food hygiene.

Meetings of Commissions

The second, or main, part of the business agenda will comprise the meetings of the commissions. These are listed as follows:

Commission 1: Scientific problems of low temperature physics and thermodynamics. Industries using very low temperatures, rare gases.

Commission 2: Transfer of heat. Thermal properties of materials. Insulating materials.

Commission 3: Design, construction and operation of machinery for refrigerating and air conditioning plants.

Commission 4: Applications of refrigeration to foodstuffs and agricultural produce.

Commission 5: Cold stores and ice-making plants.

Commission 6: Applications of refrigeration excluding foodstuffs and agricultural produce.

Commission 7: Refrigerated transport by land and by air.

Commission 8: Refrigerated transport by water.

Commission 9: Education.

Fire Destroys Yakima Cold Storage

FIRE destroyed the Gleed Cold Storage & Packing Plant, Yakima, Wash., June 17 and caused an estimated damage of $150,000. It is believed the fire started in a pile of boxes about 20 feet from the plant. The platform encircling the building was ablaze minutes after the fire started. The building was a two floor brick structure with basement. Fallen timbers and cork insulation blazed in the basement sending dense clouds of smoke skyward for several hours. Cause of the fire is undetermined. The plant is being rebuilt immediately.

Packer Enlarges Plant

FRISCO PACKING CO., Oklahoma City, Okla., has begun construction of a $30,000 addition to its plant. The 3,400-square-foot addition will house a cooler and freezer.

New Vice-President NARW

AS announced in the July issue of INDUSTRIAL REFRIGERATION, F. D. Newell, Jr., of The Minneapolis Cold Storage was elected vice-president of the National Association of

F. D. Newell, Jr.

Refrigerated Warehouses. Mr. Newell has been an active association member for many years and is well qualified to help direct its activities.

Three More Warehouses Receive Safety Awards

JONES Cold Storage Corporation, Norfolk, Virginia; Merchants Refrigerating Company, Hopkins, Minnesota; and Scottsbluff Ice and Storage Company, Scottsbluff, Nebraska have been awarded Safety Certificates for outstanding plant safety records by the National Association of Refrigerated Warehouses.

In presenting the awards, NARW Safety Committee chairman, A. R. Carstensen, president of Crystal Ice and Cold Storage Company, Sacramento, California, pointed out that the plants qualified by going one year without a lost-time industrial accident.

Including these three latest awards, a total of thirty-three refrigerated warehouses have received Safety Certificates since NARW's Safety Committee launched its intensive drive to improve industry safety conditions last year.

The second phase of the drive is now underway with a survey to determine the present accident ratio.

New Kroger Warehouse

A NEW Kroger warehouse, to include refrigeration and freezing rooms is planned for Louisville, Ky., to serve more than 100 stores in the area. Total floor space will be about 200,000 square feet.

Kopmeier Estate Half a Million

THE estate of Norman J. Kopmeier, president of the Wisconsin Ice & Coal Co., was estimated at about half a million dollars. He died June 4 at the age of 74.

Mr. Kopmeier's will left half of the estate, plus cars, jewelry and furniture to the widow, Loretta. The remainder was divided into two trusts — one for a daughter, Mrs. Rosemary Bradford of 2015 E. Glendale Av., Whitefish Bay, and the other for a son, Norman J. Kopmeier, Jr. Because the son died three months after his father's will was drawn, both trusts would benefit Mrs. Bradford.

Safety Council Issues Booklet on Accidents

ACCIDENTS add to the cost of doing business. That's the theme of the National Safety Council's new booklet, "Plus Cost." The booklet tells concisely how accidents nibble at profits and outlines the "why" and "how" of accident control. Intended specifically for those small firms with relatively few employees and no safety staff, "Plus Costs" sets down seven easy steps for eliminating accidents.

The booklet explains in non-technical terms just how these common-sense principles make for a good safety program and at the same time increase production. Single copies of the eight-page booklet, attractively illustrated with two-color drawings, may be obtained by writing the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

The Elks Make Ice Cream

THE front cover of the July issue of The Elks Magazine has a home-made ice cream picture that will take a lot of people back many years, back to when homemade ice cream was a great event in their young lives. It will take others back only a few days to some good eating.

The picture shows the whole family and the dog out in the yard making ice cream. Dad turns the freezer while the youngsters look on and wait impatiently, particularly the younger ones. You can almost hear the little girl say, "Daddy it's my turn to lick the dasher." What's more the whole operation is entirely modern. Prepared ice is being used and it was bought in wet-strength paper bag.

Educational Sessions NAPRE

(Continued from page 40)

and Public Building systems.

The two all-reefer ships under construction for the United States Navy near New Orleans — the first of this class — will be discussed in detail as regards plant, system, compartments, their design and installation.

Plant Inspection

The field trip will show latest applications of refrigeration to sugar refining, both process operations and storage. This plant, Godchaux Sugars, Inc., has received considerable publicity for these innovations.

Efforts were made in the selection of the topics to emphasize the theme of the meeting: "Make this your vocation-vacation". The New Orleans hosts are championing a "See America First" program. They urge all NAPRE members and interested parties to plan their vacations for Convention-time. Suggested is a circuitous route to and from New Orleans to see as much of the USA as possible.

For the ladies, an elaborate schedule of sight-seeing, teas, shows, river boat excursion, and shopping has been planned. This is in addition to the regular nightly entertainment planned for attendants and their ladies. Daily, the men will be preoccupied as outlined in speaker topics, tours, etc.

OHIO SPECIAL ICE CANS

WELDED — RIVETED

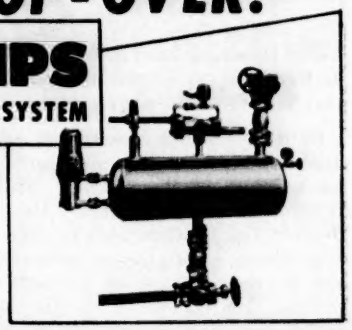
ICE CAN GRIDS

Industrial Trucks and Trailers

THE OHIO GALVANIZING & MFG. CO.
NILES OHIO

NO SLOP-OVER!

PHILLIPS LIQUID RETURN SYSTEM



● SAFEGUARDS Compressors

● ASSURES Economical Operation with Full-flooded Coils

Here's the proved method of protecting ammonia compressors from the damages of liquid slop-over. Phillips Liquid Return Systems effectively return refrigerant liquid from a suction line trap to the liquid receiver or liquid line—and, effect savings in operation. With a Phillips System, full flooding of coils is possible for maximum efficiency of evaporation and properly-conditioned suction gases are assured.

PHILLIPS FLOAT CONTROLS
For "Freon"— 1 to 1000 Ton Cap
For Ammonia— 1 to 2000 Ton Cap

Several types of systems are available: for Gravity, Injection Lift and Pressure Lift operation, in sizes up to 1000 tons. A Phillips Engineer will gladly help to select the right one to assure complete protection for you. Write today for full information in Bulletin LRS-50.

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS REFRIGERATION CONTROLS SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS
REPRESENTATIVES: THE C & S EQUIPMENT CO.
2103 S. San Pedro Street, Los Angeles, California
MASON EMANUELS CO. • 1000 Fourth Ave., South, Seattle 4, Wash.

DEATHS

George L. Gross

George L. Gross, 70, Duluth, nationally known refrigerated warehouseman, died June 5 while attending a business meeting at Brainerd, Minn. At the time of his death Mr. Gross was president of the Northern Cold Storage & Warehouse Co., Duluth, which position he held since 1949. Mr. Gross had been with the company for 38 years.

George L. Gross

A native of Stevens Point, Wis., Mr. Gross had been active in civic and business affairs in Duluth for many years. He was an engineering graduate of the University of Wisconsin.

The Directors have elected Mr. G. H. Westberg, an official of the company for 30 years, as president.

GEORGE WALTER GROVE, 81, retired Southeastern sales manager for Ice Cooling Appliance Corp., died, at his home at 4569 Rainbow Drive, Decatur, Ga., Sunday, June 6, after a long illness. Mr. Grove spent the last quarter century of his active business life contacting the ice industry over a wide territory as an ice refrigerator salesman. He retired in 1948.

MARK ANTHONY ENGLISH, a founder and president for 14 years of the Crown City Ice Co., Arcadia, Calif. died June 9. A native of Tacoma, Wash., he had lived in Arcadia for 14 years, previously residing in Pasadena for 43 years. He was 58. He leaves his widow, Mrs. Evelyn English and a son, Jack of Pasadena.

OTTO KIRST, manager of the West Plains Ice & Cold Storage Company, West Plains, Mo., died May 31, after an illness of six months. He was 53. He came to West Plains seven years ago.

C. Dudley Armstrong

THE death of C. Dudley Armstrong, a director and former vice-president and secretary of the Armstrong Cork Company, died June 8 at the home of his son-in-law, Dr. J. J. Kohlhas, in Haverford, Pa. Mr. Armstrong had been ill for some months. He was 65.

Born in Wilkinsburg, Pa. in 1888, Mr. Armstrong was the grandson of Thomas Morton Armstrong, the founder and first president of the Armstrong Cork Company, and son of Charles Dickey Armstrong, who succeeded his father as president of the company from 1908 to 1929. He retired as secretary and vice-president in charge of foreign operations of the company last September, but remained on the Board of Directors, of which he had been a member since 1917.

He entered the employ of the Armstrong Cork Company in 1910 following his graduation at Yale University where he was second in his class. He was also a graduate of the Hill School, Pottstown, Pa.

ARTHUR E. ROEBKE, St. Louis, Mo., died suddenly on June 19 of a heart attack. He had been manager of Frick Company's St. Louis branch office for more than twenty years. He will be sadly missed by a host of friends and business associates. Mr. Roebke was graduated in mechanical engineering from the University of Missouri in 1918. He had been a member of the American Society of Refrigerating Engineers for 25 years and was a registered professional engineer in the State of Missouri. Practically his entire working life was spent in the refrigeration field. He is survived by his widow, Mrs. Barbara Roebke.

EARL W. MILLER, 62, Montgomery, W. Va., sales manager for the Fayette Bottling and Ice Co. for the past 28 years died June 20, after a short illness. Mr. Miller had resided in Fayette county all his life. He is survived by his mother and widow.

IRVING H. BARTH a retired executive of the Greenport Ice Co. Greenport, L. I. collapsed and died June 4 while riding in a company truck in Riverhead. He was 58. He served overseas in World War I and was a member of The American Legion. He retired five years ago.

D. R. BURKE, SR. owner of Burke's Cold Storage Lockers in Seattle, Wash. died May 24, while enroute to his daughter's commencement in San Rafael, Calif. He was 53.

Joseph Raymond

JOSEPH RAYMOND, 73 editor of Modern Refrigeration, London, England from 1916 to 1945 died on April 23 at his home in Lancing, Sussex.

Mr. Raymond was a leading figure in refrigeration activities in the United Kingdom and served for 40 years as honorary secretary of the British Institute of Refrigeration. His association with the refrigeration industry began in 1898 with the publication in that year of *Cold Storage and Ice Trades Review*, the first British refrigeration journal. In 1934 he purchased the publication *Ice and Cold Storage* and in 1939 the consolidated publications were named *Modern Refrigeration*.

He represented the Institute International du Froid, Paris in the United Kingdom and organized the Fourth International Refrigeration Congress in London in 1924 at which 47 countries were represented.

M. Piettre

THE DEATH of Dr. M. Piettre, a past director and honorary director of The International Institute of Refrigeration occurred in Paris early this year at the age of 75. Dr. Piettre had been very active in the International Institute Movement from 1915 to 1919. The French government entrusted him with a mission to Argentina and Uruguay for controlling stored meat. This was his first important contact with the refrigeration problems to which he devoted subsequently the greater part of his activities. He remained in Brazil from 1920 to 1923 and gave courses on the control of meat, on biological chemistry and on the application of refrigeration.

WILLIAM RICHMAN, ice cream manufacturer, Sharptown, New Jersey, died at his home July 12. He was 82 years old. Mr. Richman founded the Richman Ice Cream Company in 1886 and the Woodstown Ice and Coal Company at nearby Woodstown in 1900. In 1916 he joined in founding the Waddington Milk Company in New York. He was a director of the Woodstown National Bank and Trust Co.

News of People

CLEM D. JOHNSTON, past General President of AWA, and President of the Chamber of Commerce has been nominated by President Eisenhower to be a member of the Public Advisory Board of the Foreign Operations Administration.

New Aluminum Alloys For Stratojet Bombers

(*Continued from page 42*)

After the parts have been fabricated, they are treated in one of the three Lanly electrically fired furnaces where the results of months of natural aging are accomplished in a matter of hours. In these furnaces, the parts are subjected to elevated temperatures for carefully specified periods of time. One alloy, for example, is held at 250 F for a period of 24 hours for the purpose of artificial precipitation aging.

As in the case of solution heat treatment, variations from the prescribed limits in either time or temperature seriously affect the corrosion resistance of the alloy, and can result in failure to attain maximum tensile strength.

Cold Storage Expands

A COLD storage building on Harrison Street, New York has been purchased by the West Side Cold Storage Inc. When renovations are completed it will be used for refrigerated warehousing in conjunction with the company's main building.

Producing Dry Ice

(Continued from page 31)

This product has many uses, not only for the preservation of perishable foods and discouraging the growth of bacteria, but also for cold shrinking of machine parts and the cold treatment of steels. Research is expected to uncover other uses.

The production of Dry Ice actually begins in the lime kilns at the South Plant where carbon dioxide gas is a by-product of the lime burning process. After being purified, the carbon dioxide is piped to the ice plant where it is run through a compression and cooling process and eventually becomes liquid CO_2. The liquid gas is expanded in four stages, resulting in a drastic "cooling" of the liquid.

The expansion and cooling produces solid carbon dioxide which resembles snow. This soft, porous ice is then compressed under 2500 pounds pressure and formed into a solid block weighing over 200 pounds. After discharge to a conveyor, the block reaches band saws, where it is cut into desired weights and sizes. The cakes are then wrapped in heavy paper.

Chicago Bus Station

(Continued from page 32)

for use with maximum 75 F city water. After installation, it was decided to add a Marley cooling tower on the penthouse roof. Proper baffles within the heads were knocked out to make the equipment 2-pass. Over 900 gpm are now circulated with a 15 ft. pressure drop. Maximum water temperature off the tower has been 85 F.

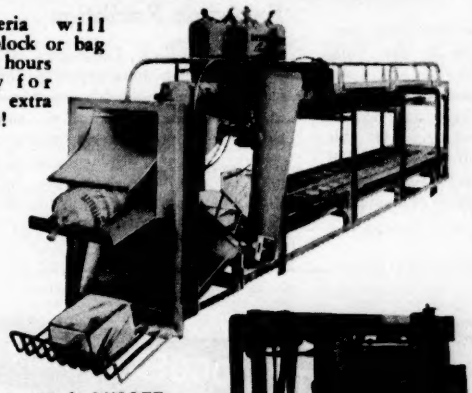
Chicago Section ASRE Elects Officers

AT THE last section meeting, Chicago, ASRE, officers were elected and installed for 1954-1955 term. They are: Chairman, J. E. Salmon, Carrier Corp.; 1st Vice-president, E. J. Robertson, Wilson & Co. Inc.; 2nd Vice-president, C. E. Cartier, Naess & Murphy; Secretary, E. C. Ward, United Cork Co.; Treasurer, J. R. Kelahan, Jr., National Association Practical Refrigerating Engineers and Industrial Refrigeration. The season 1953-54 closed with a beer and skittles night in May, and the annual golf tournament in June.

ICE-A-TERIA

ICE VENDORS FOR EVERY REQUIREMENT

Ice-A-teria will vend block or bag ice 24 hours a day for those extra SALES!



Perfection-Made MILLER 300 lb. model scores 50 tons of ice per hour. It's the lowest priced heavy-duty scoring machine on the market today.

Perfection ICE SCORING MACHINE

SCORING MACHINE PARTS AVAILABLE FOR IMMEDIATE DELIVERY

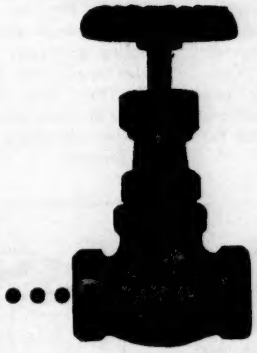
P.O. Box 2140, Fort Worth, Texas

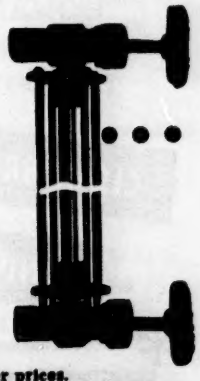
SHANK

AMMONIA VALVES AND REFRIGERATION PRODUCTS

SEMI-STEEL SHUT-OFF VALVE

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem — Shank design base—perfect alignment. Long life packing ring.





ALL-STEEL GAUGE SETS

All-Steel Construction. Automatic shut-off of liquid in case of glass breakage. Composition packing rings give long life, no-leak seal.

If your jobber doesn't stock—write

See your jobber—or write us for prices.

CYRUS SHANK CO.

4650 W. 12th Place, Chicago 50, Ill.

MANUFACTURERS' NEWS

New "Freon-22" Plant In Louisville

PLANS for construction of a new plant on the site of Du Pont's Louisville, Ky., Works for increase in the manufacture of "Freon-22" monochlorodifluoromethane, commonly used as a refrigerant and aerosol propellent, was announced recently by the company's "Kinetic" Chemicals Division.

Construction of the new facilities, augmenting those at Deepwater Point, N. J., and designed to meet adequately the refrigeration industry's needs for many years, will begin this summer under the direction of the company's Engineering Department. Completion is scheduled for early fall of 1955.

Capacity of the plant was not disclosed, but the company said it will be based on long-range estimates of the need for "Freon-22" as a refrigerant and aerosol propellent, and as an intermediate in the manufacture of its "Teflon" tetrafluoroethylene resin. The new Louisville plant for "Feron-22" will be of the most modern open-type construction, with central controls.

Cardox Corporation Opens New Warehouse

A WAREHOUSE and chain of subdepots has been opened by Cardox Corporation, for the handling of dry ice in the Milwaukee area, at 5255 N. Hopkins St., this being a Chicago company which manufacturers commercial carbon dioxide. Harry E. Franhoefer has been appointed district manager for the company, and he advises that the products stored and handled in this area will include carbon dioxide in gas, bulk and cylinders. Franhoefer as been associated with the sale of such products for breweries, bottlers, dairy and ice cream firms in this area for 23 years.

Student Engineers Study Insulating Methods

TRAINING and observation in the field comprise an important part of the extensive schooling given student sales engineers of the Armstrong Cork Company, Lancaster, Pa. A group of trainees are shown here studying construction features of an open style refrigerated display case at the manufacturing plant of the Bally Case and Cooler Company at Bally, Pa. L. G. Saettele, assistant Bally sales manager, at right, is explaining details of design.

Trainees of Armstrong Cork study construction of refrigerated case

The delegation visited Bally recently to see how insulating materials are used in the manufacture of commercial refrigeration equipment. They spent the day observing all phases of work on the Bally assembly lines.

Trainee groups such as this have been making annual field trips to the Bally plant for the past 10 years.

Members of the group here are engineering graduates of colleges and universities in all parts of the country. On this tour, they were under the direction of James O. Sampson, assistant sales manager of the Armstrong Equipment' Insulation Department.

Creamery Package Names Seattle Manager

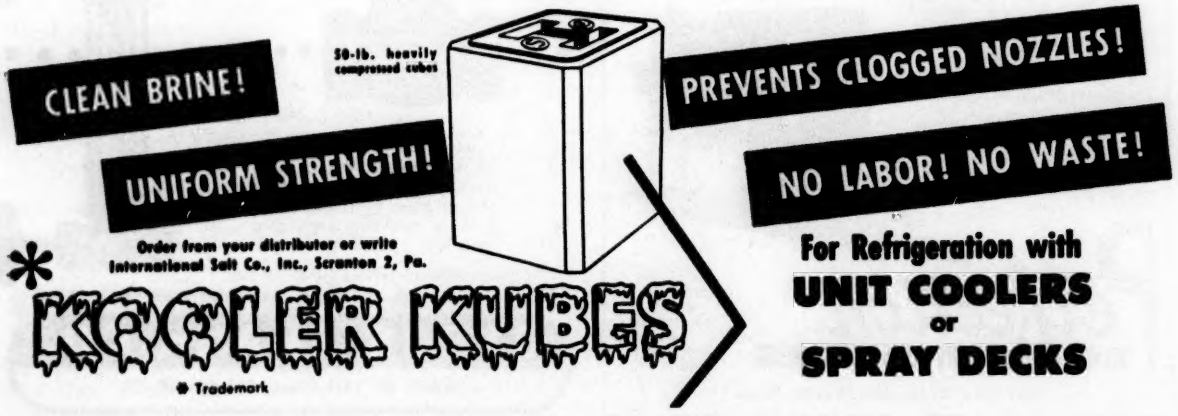
JOE P. CYR, Assistant Manager of The Creamery Package Mfg. Company's Seattle Branch office, was recently appointed CP Seattle Branch Manager according to an announcement by Mr. J. L. Brazee, CP Vice-President in Charge of Sales.

Joe P. Cyr

Mr. Cyr joined The Creamery Package Mfg. Company in 1936 and during the years he has been with CP, he worked in the capacity of salesman to CP's Portland Branch and later CP's Seattle Branch, covering the Seattle City territory. In 1953 he was promoted to Assistant Manager of the Seattle Sales Branch and has held this title until his recent promotion. Joe, who comes from a family that has always been in the dairy business, at one time operated a small ice cream business by himself. He served for four years with the U.S. Navy in World War II.

United Cork Expands Facilities

UNITED Cork Companies of Kearny, New Jersey, have expanded their manufacturing operations by acquiring facilities in Wilmington, Delaware, for the production of cork pipe covering and cork fitting covers. Prompt shipments of these products are available from the Wilmington site, which will operate as a division of United Cork Companies.



CATALOGS AND BULLETINS

Five Steps to Productive Maintenance

AN 18-PAGE bulletin GEA-6087, published by General Electric Co. provides detailed information on organizing to meet the demands that automation will make on the plant electrical maintenance program.

"Five steps to Productive Maintenance", the title of the booklet, outlines the following major maintenance data: gathering equipment information, determining extent of routine maintenance, establishing a routine operating control system, evaluation for critical maintenance and establishing a critical maintenance program.

Residential Towers

A COMPLETELY new residential cooling tower Catalog, offered by Halstead & Mitchell of Pittsburgh, Penna., describes in detail mechanical, physical and operating characteristics of the company's latest line of residential cooling towers for air conditioning.

The 8-page Catalog, RE-1, describes these Halstead & Mitchell towers which according to the manufacturer conserves over 95 percent of the cooling water used in air conditioning systems, presenting graphically tower capacities for various wet bulb temperatures. Indoor and outdoor tower installations are both shown in full-page line diagrams, as well as details of construction.

Bulletin on Instant Water Coolers

A BULLETIN on instant water coolers has been issued by the Frick Co., Waynesboro, Pa. These coolers, the bulletin explains, take their name from the fact that they will cool water or other liquids during wide temperature range while passing over the zig-zag coils of the cooler one time only. The bulletin describes and illustrates some of the more important uses of these coolers which have been installed by prominent firms throughout this and overseas countries. These uses include a dairy products building, a drinking water system, in construction of the Wolf Creek Dam in Kentucky, an ice plant, brewery, laboratory, bottling plant and others.

FOR SALE

Used Ice Plants and Refrigerating Equipment

20 ton Ice Plant 240—300 lb. Ice Cans—4 can pull—Electric Driven
50 ton Ice Plant 616—300 lb. Ice Cans—7 can pull—Electric Driven
85 ton Ice Plant 1040—300 lb. Ice Cans—26 can pull—Diesel Driven

AMMONIA COMPRESSORS

6x6 York Y-26 — 6x6 York Y-28
6½x6½ York Y-28 — 6½x6½ York Y-38
7x7 Frick type H — 7½x7½ York Y-15
8x8 York Y-26 — 8x8 York Y-28
10x10 York Y-28 — 12½x12½ York Y-26
9x9 Frick type H capacity control D.C. 100 HP 360 RPM Syn. Motor
9x9 York Y-28 capacity control D.C. 100 HP 300 RPM Syn. Motor
10x10 York Y-16 100 HP 200 RPM Syn. Motor
10x10 York Y-16 70 HP 180 RPM Syn. Motor
10x10 York Y-28 100 HP 300 RPM Syn. Motor
12½x14½ York Y-28 D.C. 200 HP 257 RPM Syn. Motor

DIESEL ENGINES

2—3-cylinder Wolverine Diesel Engines 9¼x14 115 HP 400 RPM
1—4-cylinder Wolverine Diesel Engine 9¼ x14 135 HP 360 RPM belted to an Ideal 50 KW 62.5 KVA 1200 RPM DC Generator 1.5 KW
Shell & Tube Ammonia Condensers, Brine Coolers, Receivers, Traps; Valve & Fittings.
1—Miller Perfection Ice Scoring Machine
1—Link Belt Stinger with extra hoses—5 HP Motor
1—Gifford Wood Crusher—2 HP Motor

Write, wire or cable us on any equipment you need.

ENTERPRISE EQUIPMENT CORP.

77-79 Alexander St. Yonkers 8-8118-9
Cable Address: ENEQCO Yonkers, N.Y.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings. $15.00 per inch for line listings.

USED EQUIPMENT-wanted & for sale

FOR SALE—10"x7" Worthington booster. 15 ton Acme shell and tube condenser. 4x4, 5x5 Fricks, 3x3, 7½x7½, 8x8, 9x9 Yorks, splash lubrication. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—Shell and tube condenser 36" dia. by 15'6" long, rebuilt with 96- 2" steel tubes. Liquid ammonia receiver 20" dia. by 16'0" long. 1 unused Gale & Towne 1-ton hoist, 3 phase, 60 cycle. Write N.M. Silverman, Red Hook, New York.

FOR SALE—COMPLETE ICE PLANTS
20 tons to 150 tons.
AMMONIA COMPRESSORS
10x10 York, 125 h.p. syn. motor.
10x10 York direct connected to 300 rpm Unaflow steam engine.
9x9 York, 75 h.p.
7½x7½ York, Model D-8.
5x5 York, V belt drive to 20 h.p. motor.
4x4 self-contained unit.
MISCELLANEOUS EQUIPMENT
2- 50 h.p. Carrier Freon compressors with evaporative condensers and diffusers. 2- 75 ton York evaporative condensers. 130 h.p. Diesel engine with 109 KVA generator. 75 h.p. 300 r.p.m. synchronous motor. 3 & 10 h.p. low pressure blowers. Brine coolers-ice tiering machines-ice cans, etc.
JOHN F. CARSON
"A" & Venango Sts. Philadelphia 34, Pa.
Phone GArfield 6-2221

FOR SALE—York and Frick 9x9, Frick 6x6 with motor, York 7½x7½ with motor, York 6x6 with the motor, Vilter 7½x7½ with motor, Vilter 9½x9½, Vilter 10½x10½ with motor. Baker self-contained unit. Cranes, condensers, brine coolers, cans, agitators, blowers, ice plants, Diesels. Parke Pettegrew, 370 W. Broad St., Columbus 8, Ohio.

FOR SALE—All fan units and freezer coils have automatic controls. Frick Fan unit No. 3775AA — ½ h.p. motor; Frick Fan unit—1½ h.p. motor-No. 3775AA; 2 sets York shelf coils, about 3000 feet pipe for ice cream; set York shelf coils, about 1200 feet pipe for meat; combination sweet water tank, 2300 feet pipe-ice tank, 1800 feet pipe — each has separate controls. About 340 feet 4" pipe, insulated 45 and 90 degree ells used for sweet water, installed in 1950. Set freezer coils, 1700 feet pipe; set cooler coils, 1700 feet pipe and drip pans; set cooler coils, 550 feet pipe and drip pans; 2 sets cooler coils, 1800 feet pipe and drip pans; ammonia receiver, 16' long, 1'8" diameter; Moorlane oil separator, type SB; Electric Temperature check for Diesel engines; 8"x18" CP compressor; 6"x12 CP compressor and 20 h.p. motor, V belts & starting switch; 4 cyl. LeRoi engine, natural gas; 6 cyl. LeRoi belted to 60 KW generator and switchboard; 50 h.p. style VA-F.M. Diesel belted to generator, 75KW; 120 h.p. style VA changed over open head F.M. Diesel; F.M. generator, direct connected excitor, 63 KVA; General Electric switch board — handle 2 generators with EM automatic synchronizer. Write W. D. WRIGHT PRODUCE CO., Box 699, Hobart, Okla.

POSITIONS AND HELP WANTED

BUSINESS OPPORTUNITY—Commercial-Refrigeration Distributor, franchise covering 6 counties, many fine accounts, 50% mark-up; sales $30,000 year; agricultural community; priced right. The Apple Co., Brokers, Cleveland, Ohio.

WANTED—Experienced refrigerated warehouse superintendent for large new plant located in South, to be completed about January 1st, 1955. Fine opportunity for permanent position with excellent earnings. Furnish complete references. Address Box AU-3, c/o Industrial Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

REFRIGERATION ENGINEER AND SUPERINTENDENT

Outstanding opportunity with a new company just completing a 3,000,000 cubic foot refrigerated warehouse. Must have full knowledge of refrigeration equipment and general cold storage warehouse operation. Reply to Inland Cold Storage Co. Inc., 7000 Holliday Drive, Kansas City, Kansas.

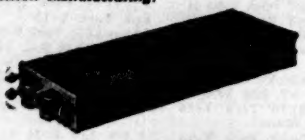
For Quick Results use our classified columns

LOOK TO REMPE

PIPE COILS—FIN COILS

FOR REFRIGERATION, AIR CONDITIONING, HEATING

Rempe Coils are accepted in the industry as quality equipment that is built for long service without maintenance. Rempe Coils are used on the most difficult jobs and forgotten. This confidence has been earned the hard way—through proper engineering, good quality materials and precision manufacturing.



Coils and Bends of any metal or design engineered to your requirements. Send us your problems for engineering assistance.

A request on your letterhead will bring free copy of new Engineering Data Book on Pipe and Fin Coils.

REMPE COMPANY

348 N. Sacramento Blvd., Chicago 12, Ill.

VAN RENSSELAER

H. GREENE

ENGINEERS

COMPLETE PLANT DESIGNS INCLUDING BUILDING AND EQUIPMENT

11 PARK PLACE NEW YORK 7, N. Y.

FRED OPHULS

& ASSOCIATES

Consulting Engineers

112-114 West 42nd St. New York City 36

Industrial Power Plants

Refrigeration and

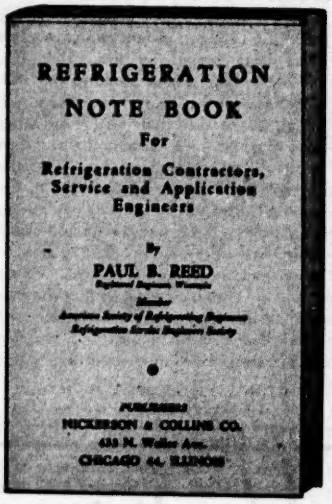
Cold Storage Warehouses,

Reports, Appraisals and Management

A Vest Pocket Book of Valuable Data

REFRIGERATION NOTE BOOK

by PAUL B. REED



Vest Pocket Size—3¼ x 5 inches
204 Pages—Flexible Binding

THIS NOTE BOOK of condensed refrigeration information represents many years of work in accumulating practical data—"culling out" all extraneous material—so as the author states, "the reader will find a handy and easily carried source of information not usually kept in memory."

You will be surprised at the wealth of material that has been included in this convenient and practical reference Note Book. It is written in layman's language, without complicated formulas. In short, it is a tool responsible for the operation of refrigeration equipment.

$2.00 Postpaid

Nickerson & Collins Co., Publishers
433 N. Waller Ave., Chicago 44, Ill.

ADVERTISERS

Armstrong Machine Works 7

Ballard Sales Co. 37
Barada and Page, Inc. 8
Bateman Foundry and Machine Co., Inc. 41
Bower Chemical Co., Henry 44
Butcher Boy Refrigerator Door Co. 1

Carrier Corp. 14
Caterpillar Tractor Co. 12
Chicago Nipple Mfg. Co. 41
Classified Advertising 55

Enterprice Equipment Corp. 55

Frick Co. 44

Gifford-Wood Co. 2
Greene, Van R. H. 56

International Salt Co. Inc. 54

Jamison Cold Storage Door Co. Back Cover

King-Zeero Co., The 39
Knickerbocker Stamping Co. 6
Kramer Trenton Co. 5

Link-Belt Co. 35

National Pipe Bending Co. 9
National Rejectors, Inc. 22
Niagara Blower Co. 43
Nickerson & Collins Co. 56

Ohio Galvanizing & Mfg. Co., The 51
Ophuls & Associates, Fred 56
Owens-Corning Fiberglas Corp. ..... Inside Back Cover

Perfection Ice Scoring Machine Co., The 53
Phillips & Co., H. A. 51

Refrigeration Engineering Co. 27
Rempe Co. 56

S & S Vending Machine Co. 39
Schoelkopf Mfg. Co. 49
Shank Co., Cyrus 53
Solvay Process Div. 31
Sporlan Valve Co. 10

Taylor Instrument Companies 29
Texas Co., The ..... Second Cover

United Cork Companies 48

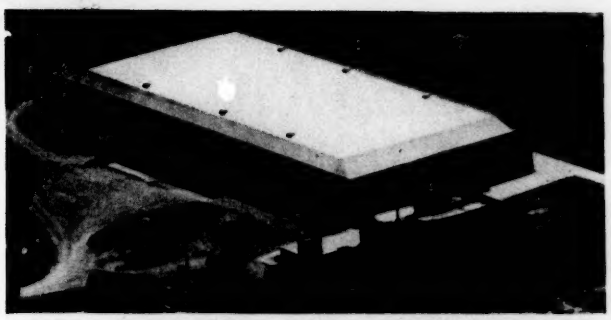
Vogt Machine Co., Inc., Henry ..... Second Cover
Voss Co., Inc., J. H. H. 47

Wanted and For Sale Advertising 55

York Corp. 5

big job

...or small



These five types of Fiberglas Insulation provide

unexcelled thermal efficiency

in every low temperature application

Whether it's a walk-in cooler or a million cubic foot warehouse—you'll find the right insulation for the job in the varied line of Fiberglas* Low Temperature Insulations. Five basic types provide unexcelled thermal efficiency for every kind of wall, roof, ceiling, floor and pipe.

And, you can design installations with complete confidence in the specifications of Fiberglas Insulations. For these are inorganic, man-made insulations—they do not vary from carload to carload.

Still another point to remember when considering insulations is the proved performance of Fiberglas Insulations. In 15 years of use, they have demonstrated their superior durability, sustained efficiency and economy in hundreds of installations.

Use the table below for quick reference to the complete line of Fiberglas Low Temperature Insulations. For further information, write Owens-Corning Fiberglas Corporation, **Dept. 165-H, Toledo 1, Ohio.**

OWENS-CORNING

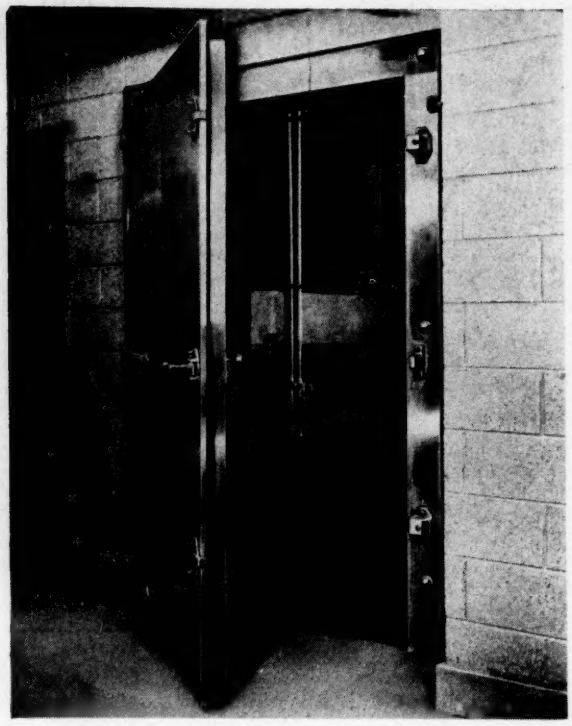
FIBERGLAS

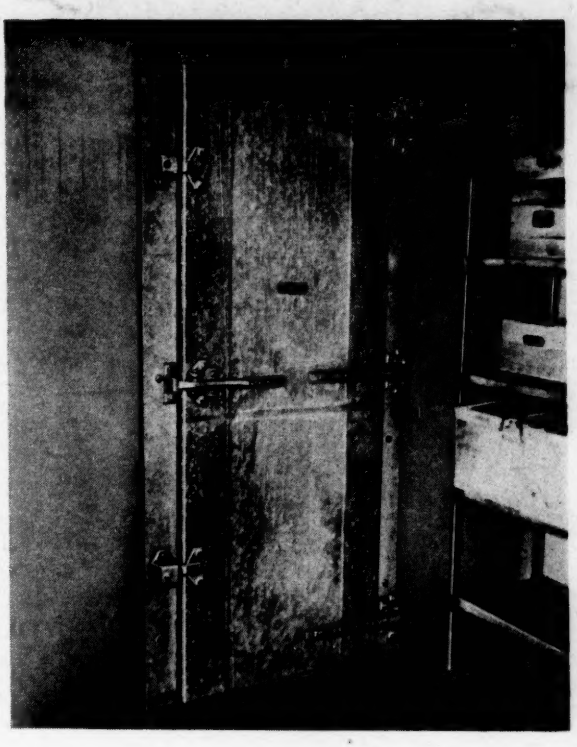
* Fiberglas is a trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation.

FIBERGLAS LOW TEMPERATURE INSULATIONS

Product	Major Uses	Standard Sizes	Approximate Density	Thicknesses (Inches)
Fiberglas PF Insulation	Walls, partitions, ceilings, mechanically supported	24" x 48"	2 lb./cu. ft. 2½ lb./cu. ft. 3¼ lb./cu. ft. 4¼ lb./cu. ft. 6 lb./cu. ft. 9 lb./cu. ft. *11½ lb./cu. ft.	1, 1½, 2, 3, 4 1, 1½, 2, 3, 4 1, 1½, 2, 3, 4 1, 1½, 2, 3, 4 1, 1½, 2, 3, 4 1, 1½, 2 2
Fiberglas AE Board	Walls, partitions, ceilings, asphalt adhered	12" x 36"	6 lb./cu. ft. 9 lb./cu. ft.	1, 1½, 2, 3, 4 2
Fiberglas AE-F Board	Floors only	12" x 36"	6 lb./cu. ft.	2, 3, 4
Fiberglas Roof Insulation	Roofs above low temperature spaces	24" x 48"	11½ lb./cu. ft.	½, ¾, 1 1¼, 1½, 2
Fiberglas Dual Temp Pipe Ins.	Low temperature pipe lines	Coverage for ½" to 30" dia. pipes in 3' lengths	9 lb./cu. ft.	1, 1½, 2, 3, 4

* Available in Western United States only.

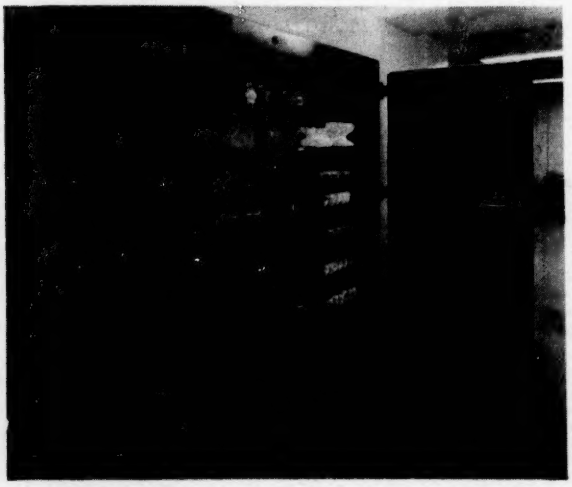




For Applications Down To −20° F.

Select JAMISON LO-TEMP Doors for Efficiency and Economy

For any low temperature application where an infitting door will best serve your purpose—down to −20°F.—the perfect door is a JAMISON LO-TEMP. It is an efficient infitting door, equipped with super-safe single seals, E-Z Open fasteners that maintain a tight seal but open with minimum effort with lever handle, and positive action Adjustoflex Hinges—stainless clad or Standard, wood-back galvanized face. They work better, look better, stand up longer. For complete information, specifications and dimensions, write for Catalog Section 3, Jamison Cold Storage Door Company, Hagerstown, Maryland.



More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.